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ABSTRACT

The 1972-73 Michigan Educational Assessment Program (MEAP) provided information on 22 measures of students and schools. While some of the data were gathered in routine Michigan Department of Education reports, student performance data were gathered using the Michigan Assessment of Basic Skills battery, Form VMT during January 1973. The battery consisted of four tests: Word Relationships, Reading, Mechanics of Written English, and Mathematics. For each of the four tests at each grade level, the raw score distribution was transformed into an equated standard score corresponding to 1969-70 assessment tests. While some of the reliability estimates of the brief subtests are not high enough for the assessment of individual students, the estimates for the four tests and the composite scores are sufficiently high for that purpose. None of the tests was unduly speeded. A majority of the fourth grade achievement tests were somewhat difficult for students at grade 4 and a majority of the seventh grade tests were of somewhat less than average difficulty for seventh graders. The tests contain items that possess acceptable to excellent ability to discriminate between high- and low-scoring students. (Author/DEP)

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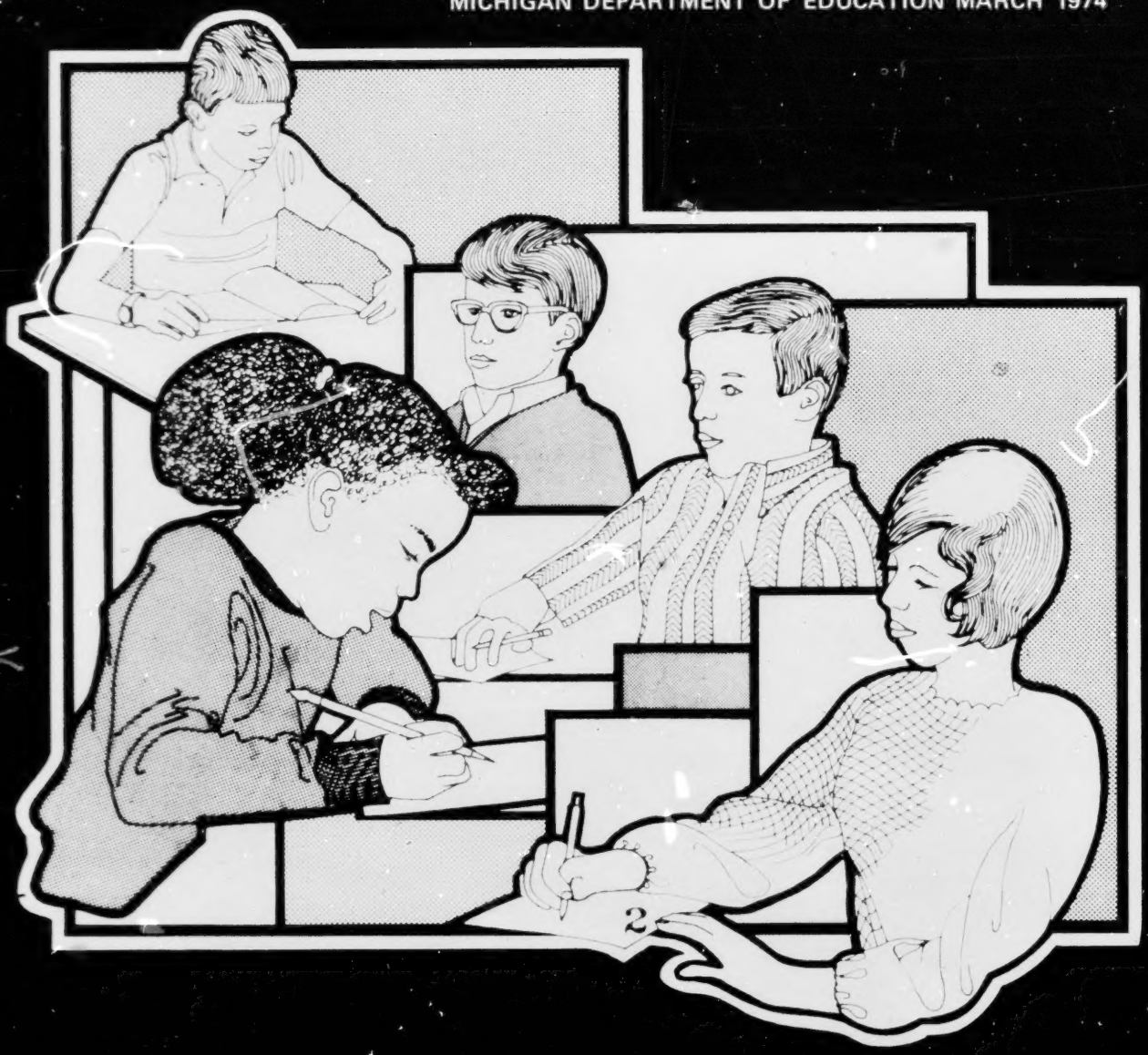
Technical Report

THE FIFTH REPORT OF THE 1972-73 MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM

MICHIGAN DEPARTMENT OF EDUCATION MARCH 1974



TECHNICAL REPORT OF THE

1972-73 MICHIGAN EDUCATIONAL ASSESSMENT BATTERY

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Educational Testing Service

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INTRODUCTION

The Michigan Educational Assessment Program (MEAP) is designed to assess educational needs in the state. MEAP provides basic information about the educational attainments of fourth and seventh graders and the allocation of resources for all Michigan school districts. A complete description of the Michigan Educational Assessment Program may be found in the publication entitled Objectives and Procedures[1], which was the first report of the 1972-73 MEAP.

The primary function of this report is to provide the technical information needed to evaluate the instruments and techniques used in the 1972-73 educational assessment program. The report is intended primarily for people with some expertise in psychometrics, such as directors of research, research consultants, and school counselors.

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[1] Objectives and Procedures of the Michigan Educational Assessment Program, 1972-73. 1972-73 Assessment Report No. 1, 1972. Lansing, Michigan: Michigan Department of Education.

THE 1972-73 MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM

The 1972-73 Michigan Educational Assessment Program provided information on twenty-two measures of students and schools. A list of these measures is presented in Table 1. They can be classified into four major categories: school resources; student background; school and student performance; and, school or school district size. A complete definition of each measure is given in the Local District and School Report: Explanatory Materials[1]. The report that follows provides technical information about the development and reporting of school and student performance measures. Included for the first time this year are correlations computed at the district and school levels.

In January, 1973, all students who were receiving regular classroom instruction in the content areas of reading, English, and mathematics at the fourth and seventh grade levels in the public schools of Michigan participated in the educational assessment program. Table 2 shows the number of districts, schools, and students from or about which information was obtained for the 1972-73 assessment program. The information in this table represents the maximum number of units from which the data were obtained. The numbers reported in Table 2 may vary from the numbers of schools and districts reported elsewhere. These differences arise because data for some schools and districts were not available for every variable and because schools and districts which tested fewer than five students, as well as all non K-12 districts, were not included in normative distributions nor in the computation of correlations.

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[1] Local District & School Report: Explanatory Materials. The Third Report of the 1972-73 Michigan Education Program. Lansing, Michigan: Michigan Department of Education, April, 1973.

TABLE 1.

MEASURES AND SOURCES OF BASIC DATA[1]

MEASURES	SOURCE		
	District	School	Student
I. School Resources			
A. Human Resources			
(1) Professional Instructional Staff per 1,000 pupils		X	
(2) Teachers per 1,000 pupils		X	
(3) Average Years of Teaching Experience		X	
(4) Percent of Teachers with Masters Degree		X	
(5) Average Contracted Salary of Teachers[2]		X	
B. District Financial Resources (1971-72)			
(6) State Equalized Valuation per Resident Member	X		
(7) Local Revenue per Pupil	X		
(8) State School Aid per Pupil	X		
(9) K-12 Instructional Expense per Pupil	X		
(10) Elementary Instructional Expense per Pupil	X		
(11) Total Current Operating Expense per Pupil	X		
(12) Total Operating Millage[3]	X		
II. Student Background			
(13) Percent of Racial-Ethnic Minority		X	
III. School/Student Performance			
A. Developed Verbal Ability			
(14) Word Relationships			X
B. Basic Skills Measures			
(15) Reading			X
(16) Mechanics of Written English			X
(17) Mathematics			X
(18) Basic Skills Composite Achievement			X
C. Dropout Rate			
(19) School Dropout Rate (1971-72)	X		
IV. School or District Size			
(20) Total Membership[2]		X	
(21) Grade 4 Membership[2]		X	
(22) Grade 7 Membership[2]		X	

[1]Unless otherwise indicated, data for these measures were collected in 1972-73.

[2]Substantially changed since the 1971-72 MEAP program.

[3]New since the 1971-72 MEAP program.

TABLE 2.

NUMBERS OF DISTRICTS, SCHOOLS, AND STUDENTS
PARTICIPATING IN THE 1971-72 ASSESSMENT PROGRAM

Grade	No. of Districts	No. of Schools	No. of Students
4	593	2,462	160,615
7	570	878	163,925

TESTS OF BASIC SKILLS

The 1972-73 tests of basic skills consisted of four tests: Word Relationships, and achievement tests in Reading, Mechanics of Written English, and Mathematics. Like its predecessors, specifications for the battery were developed cooperatively by staff from Educational Testing Service, committees of Michigan teachers and other educators, and the Michigan Department of Education.

Test items for the tests were reviewed and final tests constructed by six different test committees with the aid of Educational Testing Service developmental specialists. The following is a description of the process used to develop the specifications, select the items and construct the final tests.

Development and Review of Items

In February, 1971, members of the Michigan Department of Education began to explore ways of getting Michigan teachers and administrators more involved in the test development process of the Michigan Educational Assessment Program. They were particularly interested in the formation of committees which would enable them to bring the ideas, knowledge, and experience of Michigan educators to bear on the problem of making the

Michigan Assessment of Basic Skills a more appropriate test for Michigan students.

In June the Department solicited nominations for committee membership by contacting appropriate Michigan education associations. From the nominees, the Department formed six test committees — one for each of three subject matter areas (English, reading, and mathematics) at each of two grade levels (fourth and seventh). In general, each committee was composed of an administrator, subject matter specialists, and classroom teachers with a strong background in the subject matter.

The committees formed in 1971 continued their work in preparing the tests for this 1972-73 administration. They participated in workshops that included representatives from the Department and test specialists from Educational Testing Service. (Committee members attending the 1972 meetings are listed in Appendix C.) In the course of the workshops held August 28 and 29, 1972, content specifications from previous years were reviewed and revised. Equating items were selected from form UMT (administered January, 1972) to be used in form VMT (administered January, 1973). The number of items in the Word Relationship test for seventh grade was reduced from 50 to 38. The sequence of tests was altered so that the Reading test would preceed the Word Relationship test for both grade 4 and 7. The number of items in the Reading test for grade 7 was increased from 50 to 60 items and a separately timed section containing synonyms was added. A separately timed section containing 15 grammar and usage items was added to the seventh grade Mechanics of Written English test. To accommodate this addition the number of effectiveness of written expression items was

reduced from 18 to 15, the number of capitalization and punctuation items was reduced from 20 to 14, and the length of the test was allowed to increase from 60 to 64 items.

The test development specialists from Educational Testing Service provided information about item statistics and guidance in the techniques of reviewing and revising test items. The committee members spent considerable time reviewing and discussing new materials which had been pretested in the 1972 administration and, where appropriate, these were drawn upon for the 1972-73 assessment program.

Description of the Tests of Basic Skills

The achievement portion of the assessment battery contained individually timed tests in Word Relationships, Reading, Mechanics of Written English, and Mathematics. Different forms of the tests were administered at the two grade levels, but they all consisted of four-option multiple choice questions. Table 3 shows the number of items and the time limits for each section and sub-section of the tests for each grade level. Content specifications and item classifications for each test will be found in Appendix B.

The Word Relationships test was designed to measure the student's knowledge of the meaning of words and the relationships between words and concepts.

The Reading test assessed paragraph comprehension, ability to understand words from the context in which they are encountered, and ability to identify the correct synonym for a word.

The Mechanics of Written English test consisted of four parts: part A, spelling, asked students to identify misspelled words; part B1, effectiveness of written expression, required students to select the best way of expressing a thought; part B2, grammar and usage, asked students to recognize grammatical errors; and part C, punctuation and capitalization, asked students to recognize errors of punctuation and capitalization.

The Mathematics test involved mathematical reasoning and problem solving. In addition, problems in the seventh grade test involved algebraic and geometric concepts.

TABLE 3.

NUMBERS OF QUESTIONS AND TIME LIMITS FOR EACH SEPARATELY-TIMES PART OF THE ASSESSMENT BATTERY (BY GRADE)

	Grade 4		Grade 7	
	Questions	Time	Questions	Time
Word Relationships	45	20	38	15
Reading				
A. Synonyms	50	35	15	5
B. Reading Comprehension			45	35
Mechanics of Written English				
A. Spelling	15	5	20	6
B1. Effectiveness of Written Expression	14	9	15	9
C2. Grammar and Usage	14	8	15	8
C1. Punctuation and Capitalization (Part C for Grade 7)	12	8	14	7
(Total Mechanics of Written English)	(55)	(30)	(64)	(30)
Mathematics	40	30	40	30

Scale and Reported Score Development

The raw score on each of the tests of basic skills is the number of questions the student answered correctly. For each of the four tests at each grade level, the raw score distribution was transformed into standard score distribution equated to corresponding 1969-70 assessment tests.

Equating was performed to associate a single scale with each of the four years' test forms. Separate equatings were necessary for each of the four tests (Word Relationships, Reading, Mechanics of Written English and Mathematics) for each year. First, the January 1970 scores were scaled with a mean of 50 and a standard deviation of 10. Then, the 1971 tests were equated to their 1970 counterparts. Next, the 1972 tests were equated through the 1971 scores to the 1970 scale. Then, the 1973 tests were equated to 1972 scores to the 1970 scale. Thus, all four years' test forms have common scales for each test—those of the 1970 test form.

To implement the equating it was necessary to have a minimum of approximately twenty items per test in common from one year to the next. These common items provided "anchor" tests through which the equating was performed. The Levine[1] method of equating was utilized throughout.

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[1] Levine, R.S., Equating the Score Scales of Alternate Forms Administered to Samples of Different Ability. Princeton, N.J.: Educational Testing Service, 1955. (Research Bulletin 55-23)

After these transformations, a Composite Achievement score was computed for each student. It consisted of the average of his or her standard scores on Reading, Mechanics of Written English, and Mathematics. Appendix A presents the raw and equated standard score distributions, the conversion parameters, and the percentile ranks for each test at each grade level. It also gives the equated standard score distribution and the percentile ranks for the Composite Achievement scores at each grade level.

Five equated standard scores were reported for each student tested in 1972-73: Word Relationships, Reading, Mechanics of Written English, Mathematics, and Composite Achievement.

Psychometric Properties of the Tests of Basic Skills

At each of the grade levels, 4 and 7, a spaced sample of approximately 1,000 answer sheets was drawn from the answer sheets of all the students who participated in the program. These answer sheets provided the data for determining the psychometric properties of the four achievement tests: Word Relationships, Reading, Mechanics of Written English, and Mathematics, and the Composite Achievement score. Table 4 shows the summary statistics for these tests for the samples and the total groups. Inspection of that table indicates that the fourth grade sample is slightly less able than the fourth grade total group, all the sample means being a little lower than the total group means. Inasmuch as no difference is as large as one raw score point, the standard deviations are in close agreement, and there are no statistically significant

differences, the differences are judged to be of little practical significance to the analyses. It is assumed, therefore, that the statistics that follow which are based on the sample will also describe the total group.

For the seventh grade the sample is more able and slightly less variable, on the average, than the total group. The numerical differences between the means, however, are small; hence, the sample is considered quite satisfactory for analysis purposes.

TABLE 4.

SUMMARY STATISTICS[a] ON ACHIEVEMENT TESTS FOR SAMPLE AND TOTAL POPULATIONS

	Grade 4				Grade 7			
	Sample		Total		Sample		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Word Relationships	24.91	9.17	25.43	9.25	22.62	6.85	22.01	6.98
Reading	30.75	10.44	31.16	10.32	41.26	11.30	40.52	11.62
Mechanics of Written English	34.03	10.50	34.36	10.61	43.20	10.74	42.45	10.97
Mathematics	24.46	7.71	24.76	7.77	24.48	7.82	24.08	7.84

[a] In raw score units

The properties of the tests are discussed in the following paragraphs. Tables 5 and 6 present the intercorrelations among the tests at grades 4 and 7 respectively, and Table 7 presents data on reliability, speededness, difficulty, and discrimination.

Validity: The content validity of the achievement tests, which is of utmost importance, can be judged by reviewing the procedures used in their development and by inspecting the classification of the test questions into content categories. The development of these tests has been described in an earlier section of this report, and test specifications and classification of test items are presented in APPENDIX B. Examination of these sources of information indicates that the tests have high content validity.

The extent to which the tests measure different achievement may be judged by the size of the correlation coefficients reported in Tables 5, 6, and 7. In those tables the intercorrelations among the separately-timed tests and the reliabilities of the tests at the fourth grade level and at the seventh grade level are shown. The correlations of the scores on the separately-timed sections of the Mechanics of Written English test with the total Mechanics of Written English score and the Reading subtests scores at grade 7 with the total Reading score are not reported since these correlations are spuriously high due to the contribution each subtest makes to the total score.

The extent to which each subtest makes a unique contribution to the achievements being measured may be judged by considering the differences between the correlation of the subtest with other subtests and the reliability of both subtests. If the correlation is lower than either reliability

TABLE 5.

INTERCORRELATIONS AMONG ACHIEVEMENT TESTS - GRADE 4

	READ-ING	MECHANICS OF WRITTEN ENGLISH					MATH
		TOTAL	A	B1	B2	C	
Word Relationships	.80	.78	.66	.68	.69	.63	.75
Reading		.82	.68	.73	.72	.61	.75
English: Total							.78
Section A: Spelling				.60	.60	.55	.62
Section B1: Effective Expression					.69	.57	.65
Section B2: Usage						.60	.70
Section C: Punctuation, Capitalization							.66

TABLE 6.

INTERCORRELATIONS AMONG ACHIEVEMENT TESTS - GRADE 7

	READING			MECHANICS OF WRITTEN ENGLISH					
	TOTAL	A	B	TOTAL	A	B1	B2	C	MATH
Word Relationships	.81	.71	.79	.74	.60	.62	.64	.60	.77
Reading: Total				.80	.65	.70	.70	.63	.78
A			.73	.68	.58	.57	.56	.53	.65
B				.79	.63	.70	.69	.62	.77
English: Total									.73
Section A: Spelling						.61	.55	.57	.56
Section B1: Effective Expression							.67	.58	.64
B2 Usage								.57	.62
Section C: Punctuation, Capitalization									.64

TABLE 7. STATISTICAL PROPERTIES OF ACHIEVEMENT TESTS BY GRADE

	Reliability[1]		Standard[2] Error of Measurement		Speededness				Difficulty[3]		Discrimination[4]	
					Gr. 4		Gr. 7					
	Gr. 4	Gr. 7	Gr. 4	Gr. 7	% completing	% reaching 3/4 point	% completing	% reaching 3/4 point	Gr. 4 %	Gr. 7 %	Gr. 4	Gr. 7
Word Relationships	.90	.86	2.9	2.6	83.3	93.6	92.4	98.1	55.4	59.5	.55	.52
Reading	.92	.93	2.9	3.0	82.1	94.1	NA	NA	61.5	68.8	.57	.57
A.	**	.76	**	1.6	**	**	92.3	97.7	**	63.9	**	.55
B.	**	.91	**	2.6	**	**	91.8	98.6	**	70.4	**	.58
Written English	.91	.91	3.1	3.2	NA	NA	NA	NA	61.9	67.5	.53	.51
A Spelling	.74	.82	1.6	1.8	93.3	97.2	94.7	98.2	60.0	64.5	.50	.54
B1 Effective Expression	.79	.80	1.6	1.4	89.9	96.1	96.1	98.7	61.1	76.1	.55	.59
B2 Usage	.79	.68	1.5	1.5	96.4	98.8	98.3	98.8	69.2	74.5	.60	.45
C Punctuation, Capitalization	.70	.67	1.5	1.7	94.6	98.5	95.9	98.7	56.5	55.1	.48	.43
Mathematics	.89	.89	2.6	2.6	89.6	97.0	94.5	98.6	61.2	61.2	.56	.57
Composite Achievement	.97	.96*	1.7	1.7	NA	NA	NA	NA	NA	NA	NA	NA

[1] Kudar-Richardson (20), *See text

[2] In standard score units

[3] Mean as a percentage of number of items

[4] Mean item-total r_{bis}

**These statistics were not computed since scores on the subtests were not reported.

then each subtest is contributing independently to the measurement. If the correlation is equal to or greater than either reliability, then little or no unique measurement is being contributed by using both measures. For example, Table 5 shows the correlation between part A and part B1 of the 4th grade Mechanics of Written English test to be .60. The reliabilities of these two parts are .74 and .79 respectively. Since the correlation of .60 is considerably below either reliability, .74 and .79, it is clear that each subtest is making a unique contribution to the total score.

Reliability: The reliability estimates reported in Table 7 are measures of internal consistency based on a single administration. As such, they indicate the extent to which the items that make up the test measure the same thing.

The reliability estimates for the separately-timed parts were computed using the Kuder Richardson formula 20; those for the Mechanics of Written English total score and for the Composite Achievement score in both batteries as well as the Reading total score in grade 7 were computed using this formula:

$$\text{Reliability} = 1 - \frac{\Sigma w^2 \, SE_{meas}{}^2}{\sigma t^2}$$

For the Mechanics of Written English and Reading total scores, the weights, w were each unity; the standard errors of measurement were those of the subsections; and σt^2 was the variance of the total score. For the Composite Achievement score, the weights were the appropriate A values in the conversion equations (see Conversion Data, APPENDIX A), the standard errors of measurement were those for the three tests (Reading, Mechanics of Written English, and Mathematics), and σt^2 was the composite score variance.

As can be seen from Table 7, the reliability estimates reported for the subtests of the Mechanics of Written English Test range from .67 to .82 indicating that these brief subtests are not reliable enough for the assessment of individual students. The estimates reported for the four achievement tests and the composite score, however, range from .86 and .97 indicating that these tests and the composite score are sufficiently reliable[1] for that purpose.

The standard errors of measurement, which are indices of the reliability of individual test scores, reported in Table 7, are sufficiently low to justify the use of these four tests and of the Composite Achievement score in the assessment of individual students.

Speededness: A test is usually judged to be unspeeded if virtually all of the students reach a point three quarters of the way through the test and eighty percent of the students reach the last question. Inspection of the speededness data in Table 7 indicates that the tests at both grade levels were not unduly speeded. While not everyone reached the three quarter point in any test, in each instance more than eighty percent reached the last question.

Difficulty: The data reported for this property of the tests is the average number of items answered correctly by the sample, expressed as a percentage of the number of items in the test. A test of middle average difficulty is preferable for maximum reliability. In a test consisting of questions with four alternative answers, middle or average difficulty would

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[1] Remmers, H. H. and Gage, N. L. Educational Measurement and Evaluation, Revised Edition 1955, Harper and Brothers, New York, pp. 140-141.

be represented by 62.5%. This figure is based on the assumption that "average" students would know the answers to half of the questions and get a quarter of the remaining questions right by guessing.

Inspection of the percentage indicators of difficulty in Table 7 reveals that the majority of the achievement tests including the subtests of Mechanics of Written English, were somewhat difficult for the students at grade 4. Only the English Usage subtest could be judged as being easier than middle difficulty. The grade 7 data show that a majority of the tests including subtests in Reading and Mechanics of Written English were easier than middle difficulty. Only the Mathematics and Word Relationships tests and the capitalization-punctuation subtests could be judged as being rather difficult.

Additional information about the difficulty of the fourth grade tests is summarized on page A-11 in APPENDIX A. At the top of this page are frequency distributions of the difficulty index, delta. A four-choice item that is known by one-half of the group and answered at random by the remainder would be expected to yield a delta of about 11.7[1]. For example, the observed mean for Word Relationships exceeds this middle-difficulty reference value by more than one half a delta point.

More important, perhaps, than the average difficulty is the spread of difficulty among the items. When the group to be tested represents a broad range of ability and when discrimination at both extremes of the ability range is required, then it is necessary that the items cover a very wide difficulty range. Under those circumstances items of middle difficulty for the group as a whole may be altogether too easy for one extreme group and

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[1]A fuller description of the difficulty index, delta, may be found on page 140 of Thorndike, Robert L. (ed.), Educational Measurement Second Edition: Washington: American Council on Education, 1971.

too hard for the other. Here, the upper portion of the item difficulty range appears to be well represented, but there are few items with deltas in the range of 6.0 to 9.0 in most of the tests. The inclusion of even a few items within this range in each test would materially reduce the proportions of scores that fall in the chance area. It should perhaps be noted here that, since the sample is a little less able than the total group, the deltas are slight overestimates, but no mean discrepancy is likely to exceed 0.2 delta point.

Item statistics for the seventh grade tests are summarized on page A-12 of APPENDIX A. At the top of the page are frequency distributions of the difficulty index, delta. The observed means for the four seventh grade tests lie within 10.7 and 11.9, and three of the four are somewhat higher than the middle-difficulty reference value. Here, the upper portion of the item difficulty range appears to be fairly represented, but a few additional items with deltas in the range of 6.0 to 9.0 in those parts with high proportions of scores in the chance area would result in fewer such scores.

Discrimination: An indication of the extent to which each test or subtest is internally consistent, i.e., consists of items that discriminate between high- and low-scoring students, can be found in the last two columns of Table 7. In each instance the index of discrimination reported there is the mean biserial correlation between scores on the entire test and dichotomized (right vs. wrong) item responses. The mean correlation range, which extends from .43 for the punctuation and capitalization subtest at the seventh grade to .60 for the grammar and usage subtest at grade four, indicates that the tests and subtests are composed of items that possess acceptable to excellent ability to discriminate between high- and low-scoring students.

At the bottom of page A-11 are distributions of the biserial correlations between item scores and criterion scores for the fourth grade tests. The criterion for the items in the Mechanics of Written English part scores is the 55 item total score. Otherwise, the criterion for each set is the score on the test noted at the top of the same column. Mean values of r_{bis} range from .48 for the Mechanics of Written English punctuation and capitalization subtest to .60 for the Mechanics of Written English grammar and usage subtest.

At the bottom of page A-12 are distributions of the biserial correlations between item scores and criterion scores for the seventh grade tests. The criterion score for the items in the subtests of the Mechanics of Written English test is the 64-item total score; similarly, the total score on the Reading test is the criterion score for the items that comprise the Reading subtests. Otherwise, the criterion for each set is the score on the test noted at the top of the same column. Mean values range from .43 for the punctuation and capitalization subtest to .59 for the effectiveness of written expression subtest.

CORRELATIONS

Product moment correlation coefficients were computed to investigate the relationships between pairs of means of student and school measures at the district level and at the school level. These correlation coefficients were computed using:

$$r = \frac{\Sigma xy}{N\sigma x\sigma y}$$

where x is the deviation of each mean, X, from the average of the means, Mx; y is the deviation of each mean, Y, from the average of the means, My; N is the number of units (districts or schools) involved in the calculations; and the two sigmas, σx and σy are the standard deviations of their respective distributions.

The six intercorrelation matrices that resulted from the application of this formula to various sets of data from the 1972-73 Assessment Program will be found in APPENDIX D. The coefficients presented in these matrices are an estimate of the relationships between pairs of: district means (27 measures), weighted district means (24 measures), school means at Grade 4 (13 measures), weighted school means at Grade 4 (11 measures), school means at Grade 7 (13 measures), and weighted school means at Grade 7 (11 measures). District mean and school mean correlation coefficients are an estimate of the relationship between two measures when each district or school, regardless of size, is given a unit weight in the computations. In these computations, the per pupil contribution to each relationship varies inversely with the size of the district or school membership. The weighted district mean and school mean correlation coefficients are an estimate of the relationship between two measures when each student is given equal weight in the computations regardless of the size of the district or school in which he is enrolled. District means were weighted by multiplying the mean of each district by the total membership of that district; school means for grade 4 and grade 7 were weighted by multiplying each school mean by the appropriate school membership.

Many of the correlation coefficients reported in APPENDIX D are spuriously high because one measure is an integral part of another. For example, Professional Instruction Staff per 1,000 pupils, the first measure, includes Teachers per 1,000 pupils, the second measure. Similarly, the Composite Achievement Scores at both grades are an average of the scores obtained in each of the basic skill areas. The interpretation of the coefficients purporting to estimate the relationship between such measures should be undertaken with caution.

At the district level, the correlation coefficients between pairs of means range from .0009 for the relationship between K-12 Instructional Expense per Pupil and seventh grade Reading scores to .9654 for the relationship between seventh grade Reading scores and seventh grade Composite Achievement scores. The latter coefficient is spuriously high, however. Correlation coefficients for weighted district means range for .0010 for the relationship between the Percent of Teachers with Master's Degrees and fourth grade English scores to .9909 for the relationship between seventh grade Composite Achievement scores and seventh grade Reading scores. Again, the latter coefficient is spuriously high.

At the fourth grade level, the correlation coefficients between school means range from .0042 for the relationship between Professional Instruction Staff per 1,000 Pupils and Average Contracted Salary of Teachers to .9799 for the relationship between Composite Achievement scores and English scores. The coefficients for the weighted school means range from .0017 for the relationship between Percent of Racial-ethnic Minority Students and Average Years Teaching Experience to .9847 for the relationship between Composite Achievement scores and English scores. In these instances, also, the relationship between Composite Achievement scores and English scores is spuriously high.

At the seventh grade level, the lowest correlations for school means are .0032 for the relationship between Total Membership and Average Teacher Experience and .0033 for the relationship between Word Relationships and Average Contracted Salary of Teachers. The highest coefficient, again a spurious one, is .9831 for the relationship between Composite Achievement scores and Reading scores.

SUMMARY

The 1972-73 Michigan Educational Assessment Program (MEAP) provided information on twenty-two measures of students and schools. While some of the data were gathered in routine Michigan Department of Education reports, student performance data were gathered using the Michigan Assessment of Basic Skills battery, Form VMT during January 1973.

The battery consisted of four tests: Word Relationships, Reading, Mechanics of Written English, and Mathematics. For each of the four tests at each grade level, the raw score distribution was transformed into an equated standard score corresponding to 1969-70 assessment tests.

Committees of Michigan educators assisted in the development and review of the items. In so doing and because of the representativeness of the content domain, the tests can be judged as having high content validity. By comparing correlations among the separately-timed tests and the test reliabilities it can be determined that the tests measure different achievement areas.

While some of the reliability estimates of the brief subtests are not high enough for the assessment of individual students, the estimates for the four tests and the composite scores are sufficiently high for that purpose. None of the tests was unduly speeded.

A majority of the fourth grade achievement tests were somewhat difficult for students at grade 4 and a majority of the seventh grade tests were of somewhat less than average difficulty for seventh graders. The tests contain items that possess acceptable to excellent ability to discriminate between high- and low-scoring students.

APPENDIX A

Tests of Basic Skills

Raw and Standard Score Distributions,

Conversion Parameters, and Percentile Ranks

Test Analysis of Form VMT

Grade 4

Word Relationships

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Interval
45	72	254	99.8
42-44	69-71	4412	97.1
39-41	65-67	9943	90.8
36-38	61-64	12846	82.7
33-35	58-60	13853	73.9
30-32	54-57	14763	64.6
27-29	51-53	15886	54.6
24-26	47-49	17213	43.7
21-23	43-46	17154	32.9
18-20	40-42	16118	22.7
15-17	36-38	14108	13.8
12-14	32-35	11521	6.6
9-11	29-31	7212	2.0
6-8	25-28	2575	0.4
3-5	22-24	533	0.1
0-2	18-20	86	0.0
		158477	

M_x = raw score mean	M_x = 25.43
σ_x = standard raw score	σ_x = 9.25
M_y = standard score mean	M_y = 48.6
σ_y = standard deviation of standard scores	σ_y = 11.1
Md_x = median of raw scores	Md_x = 25.21 (45 items)

Conversion Data

Reprint of Form UMT. Scale established for Form SMT with mean of 50 and standard deviation of 10.

$$Y = \underset{A}{1.2025}\ X + \underset{B}{18.0572}$$

Test Analysis of Form VMT

Grade 4

Reading

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Interval
48-50	66-68	3210	98.0
45-47	63-65	9977	91.7
42-44	60-62	15411	82.0
39-41	57-59	17418	71.0
36-38	55-56	17447	60.0
33-35	52-54	16142	49.8
30-32	49-51	14423	40.7
27-29	46-48	12651	32.7
24-26	43-45	11425	25.5
21-23	40-42	10435	18.9
18-20	37-39	9595	12.9
15-17	34-36	8787	7.3
12-14	31-33	6769	3.1
9-11	28-30	3484	0.9
6-8	25-27	1088	0.2
3-5	23-24	260	0.02
0-2	20-22	37	0.00
		158559	

M_x = 31.16

σ_x = 10.32

M_y = 49.8

σ_y = 9.6

Md_x = 32.56

(50 items)

Conversion Data

Converted to Michigan scale through scores on 45 word relationships items.

$$Y = \underset{A}{0.9708}\ X + \underset{B}{19.5878}$$

Test Analysis of Form VMT

Grade 4

Mechanics of Written English

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Interval
54-55	68-69	741	99.5
51-53	65-67	5095	96.3
48-50	62-64	10539	89.7
45-47	60-61	14458	80.5
42-44	57-59	16212	70.3
39-41	54-56	16381	60.0
36-38	51-53	15851	50.0
33-35	48-50	14423	40.8
30-32	45-47	13506	32.3
27-29	43-44	12027	24.7
24-26	40-42	10489	18.1
21-23	37-39	8996	12.4
18-20	34-36	7586	7.6
15-17	31-33	5951	3.9
12-14	28-30	3828	1.5
9-11	26-27	1750	0.4
6-8	22-24	444	0.1
3-5	19-21	105	0.01
0-2	17-18	21	0.00
		158403	

M_x = 34.36

σ_x = 10.61

M_y = 49.5

σ_y = 10.0

Md_x = 35.51

(55 items)

Conversion Data

Converted to Michigan scale through scores on 25 items in common with Form UMT.

$$Y = \underset{A}{0.9436} X + \underset{B}{17.0786}$$

Test Analysis Form VMT

Grade 4

Mathematics

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Interval
40	70	514	99.7
38-39	67-68	4069	97.1
36-37	65-66	7697	92.2
34-35	62-64	10661	85.5
32-33	60-61	12766	77.4
30-31	57-59	13738	68.8
28-29	55-56	14132	59.8
26-27	52-54	14095	50.9
24-25	50-51	13684	42.3
22-23	47-49	12898	34.1
20-21	45-46	11756	26.7
18-19	43-44	10393	20.1
16-17	40-41	9110	14.4
14-15	38-39	7918	9.4
12-13	35-36	6502	5.3
10-11	33-34	4508	2.4
8-9	30-31	2462	0.9
6-7	28-29	980	0.2
4-5	25-27	293	0.1
2-3	23-24	68	0.01
0-1	20-22	14	0.00
		158258	

M_x = 24.76

σ_x = 7.77

M_y = 50.9

σ_y = 9.6

Md_x = 25.29

(40 items)

Conversion Data

Converted to Michigan scale through scores on 21 items in common with Form UMT.

$$Y = 1.2330\ X + 20.347$$

(A = 1.2330, B = 20.347)

Test Analysis of Form VMT

Grade 4

Composite Achievement

Standard Score Y	f	Percentile Rank of Lower Limit of Interval
69	14	99.99
66-68	1929	98.8
63-65	8970	93.1
60-62	15819	83.1
57-59	19219	70.9
54-56	19047	58.9
51-53	17775	47.7
48-50	15864	37.6
45-47	14404	28.5
42-44	12814	20.4
39-41	10789	13.6
36-38	9284	7.7
33-35	7386	3.0
30-32	3962	0.5
27-29	744	0.1
24-26	97	
21-23	19	
	158136	

M_y = 50.1

σ_y = 9.1

Md_x = 51.1

Conversion Data

Average of Reading, Mechanics of Written English, and Mathematics scaled scores.

Possible score: 19-69.

Test Analysis of Form VMT

Grade 7

Word Relationships

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Interval
38	72	86	99.9
36-37	69-71	1223	99.2
34-35	66-68	4522	96.4
32-33	64-65	8505	91.1
30-31	61-62	12143	83.6
28-29	58-59	14174	74.8
26-27	55-56	15241	65.4
24-25	52-53	15600	55.7
22-23	49-50	15267	46.2
20-21	46-47	14567	37.2
18-19	43-44	13550	28.8
16-17	40-41	13048	20.7
14-15	37-38	12165	13.2
12-13	34-36	9761	7.2
10-11	31-33	6335	3.2
8-9	28-30	3327	1.2
6-7	25-27	1359	0.3
4-5	22-24	420	0.1
2-3	19-21	102	0.01
0-1	16-18	14	0.00
		161409	

M_x = 22.01

σ_x = 6.98

M_y = 48.8

σ_y = 10.3

Md_x = 22.32

(38 items)

Conversion Data

Converted to Michigan scale through scores on 38 items in common with Form UMT.

$$Y = \underset{A}{1.4732} X + \underset{B}{16.3636}$$

Test Analysis of Form VMT

Grade 7

Reading

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Interval
60	65	807	99.5
57-59	63-64	8248	94.4
54-56	60-62	13635	86.0
51-53	58-60	15154	76.6
48-50	56-57	15597	66.9
45-47	53-55	15118	57.6
42-44	51-52	14610	48.5
39-41	48-50	13399	40.3
36-38	46-48	12476	32.5
33-35	43-45	11300	25.5
30-32	41-43	10114	19.3
27-29	39-40	8545	14.0
24-26	36-38	7058	9.6
21-23	34-35	5655	6.1
18-20	31-33	4276	3.5
15-17	29-31	2984	1.6
12-14	26-28	1708	0.6
9-11	24-25	684	0.2
6-8	21-23	197	0.04
3-5	19-20	49	0.01
0-2	16-18	15	0.00
		161629	

M_x = 40.52

σ_x = 11.62

M_y = 49.6

σ_y = 9.4

Md_x = 41.99

(60 items)

Conversion Data

Converted to Michigan scale through scores on 38 word relationships items.

$$Y = \underset{A}{0.8069}\,X + \underset{B}{16.8707}$$

Test Analysis of Form VMT

Grade 7

Mechanics of Written English

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Inverval
63-64	68-69	469	99.7
60-62	65-67	3630	97.5
57-59	62-64	8420	92.2
54-56	60-61	13128	84.1
51-53	57-59	16602	73.8
48-50	54-56	17764	62.8
45-47	51-53	17731	51.8
42-44	49-51	16508	41.6
39-41	46-48	14493	32.6
36-38	43-45	12139	25.1
33-35	41-42	9930	19.0
30-32	38-40	8133	13.9
27-29	35-37	6562	9.9
24-26	33-34	5240	6.6
21-23	30-32	4240	4.0
18-20	27-29	2989	2.1
15-17	24-26	1955	0.9
12-14	22-24	949	0.3
9-11	20-21	343	0.1
6-8	17-19	127	0.1
3-5	14-16	68	0.01
0-2	11-13	24	0.00
		161444	

M_x = 42.45

σ_x = 10.97

M_y = 49.2

σ_y = 9.9

Md_x = 43.98

(64 items)

Conversion Data

Converted to Michigan scale through scores on 35 items in common with Form UMT.

$$Y = \underset{A}{0.8992}\ X + \underset{B}{11.0004}$$

Test Analysis of Form VMT

Grade 7

Mathematics

Raw Score X	Standard Score Y	f	Percentile Rank of Lower Limit of Interval
40	69	843	99.5
38-39	67-68	4413	96.7
36-37	65-66	7357	92.2
34-35	62-63	9534	86.3
32-33	60-61	11003	79.4
30-31	57-59	12049	72.0
28-29	55-56	12751	64.0
26-27	53-54	13174	55.9
24-25	50-51	13378	47.6
22-23	48-49	13447	39.2
20-21	45-47	13240	31.0
18-19	43-44	12540	23.2
16-17	41-42	11605	16.0
14-15	38-39	9839	9.9
12-13	36-37	7642	5.2
10-11	33-35	4812	2.2
8-9	31-32	2417	0.7
6-7	29-30	848	0.2
4-5	26-27	205	0.03
2-3	23-25	47	0.003
0-1	21-22	5	0.000
		161149	

M_x = 24.08

σ_x = 7.84

M_y = 50.3

σ_y = 9.4

Md_x = 24.09

(40 items)

Conversion Data

Converted to Michigan scale through scores on 22 items in common with Form UMT.

$$Y = \underset{A}{1.1964}\ X + \underset{B}{21.4910}$$

Test Analysis of Form VMT

Grade 7

Composite Achievement

Standard Score Y	f	Percentile Rank of Lower Limit of Interval
66-68	1029	99.4
63-65	7319	94.8
60-62	14393	85.8
57-59	18007	74.6
54-56	19729	62.3
51-53	19952	49.9
48-50	18604	38.3
45-47	16332	28.1
42-44	13867	19.4
39-41	11390	12.3
36-38	8428	7.1
33-35	6178	3.2
30-32	3688	0.9
27-29	1304	0.1
24-26	173	0.01
21-23	15	0.001
18-20	1	0.000
	160409	

M_y = 49.7

σ_y = 8.7

Md_y = 50.5

Conversion Data

Average of Reading, Mechanics of Written English and Mathematics scaled scores.

Possible Range: 16-68

Form VMT Grade 4

Frequency Distributions, by Sections
of Original Deltas and Biserial Correlations

Delta	Word Relationships	Reading	Mechanics of Written English					Math
			A	B1	B2	C	Total	
16.0-16.9	1							1
15.0-15.9		1				1	1	3
14.0-14.9	7	6	3				3	3
13.0-13.9	11	9	2	2	2	4	10	5
12.0-12.9	8	5	2	6	4	2	14	8
11.0-11.9	10	12	3	3		2	8	3
10.0-10.9	2	7	2	1	2	3	8	7
9.0-9.9	2	5	1	2	3		6	6
8.0-8.9	3	3	2		3		5	2
7.0-7.9	1	1						1
6.0-6.9		1						1
Total items	45	50	15	14	14	12	55	40
Mean delta	12.3	11.6	11.8	11.7	10.8	12.3	11.6	11.7
σ	1.9	2.0	1.9	1.2	1.8	1.5	1.7	2.3
r_{bis}								
.70-.79	1	8			4		4	4
.60-.69	14	17	2	4	3	1	10	14
.50-.59	18	11	6	7	3	4	20	10
.40-.49	9	8	6	2	4	5	17	9
.30-.39	3	5		1		2	3	2
.20-.29		1	1				1	
Total items	45	50	15	14	14	12	55	39
Not complete								1
Mean delta	.55	.57	.50	.55	.60	.48	.53	.56
σ	.10	.12	.10	.08	.11	.08	.11	.10

Form VMT Grade 7

Frequency Distributions, by Sections
of Original Deltas and Biserial Correlations

Delta	Word	Reading			Mechanics of Written English					Math
		A	B	Total	A	B1	B2	C	Total	
16.0-16.9	1									1
15.0-15.9	3		1	1				1	1	1
14.0-14.9	4	1	-	1	3		1	2	6	3
13.0-13.9	5	4	3	7	2	1	-	-	3	8
12.0-12.9	6	3	7	10	3	1	3	5	12	4
11.0-11.9	5	2	9	11	4	1	1	5	11	9
10.0-10.9	5	-	8	8	3	4	2	-	9	6
9.0-9.9	3	1	9	10	2	5	2	1	10	3
8.0-8.9	4	2	3	5	2	1	3		6	-
7.0-7.9	1	1	2	3	1	2	1		4	5
6.0-6.9	1	1	3	4			2		2	
Total items	38	15	45	60	20	15	15	14	64	40
Mean delta	11.9	11.3	10.6	10.7	11.3	9.9	10.0	12.5	10.9	11.6
σ	2.4	2.5	1.9	2.1	2.0	1.7	2.2	1.6	2.1	2.2
r_{bis}										
.70-.79	2	1	7	8		2			2	
.60-.69	9	2	12	14	7	5			12	17
.50-.59	14	7	17	24	7	7	7	4	25	14
.40-.49	7	3	8	11	4	-	3	7	14	7
.30-.39	6	1	1	2	2	1	4	2	9	2
.20-.29							1	-	1	
.10-.19								1	1	
Total items	38	14	45	59	20	15	15	14	64	40
Not complete		1		1						
Mean delta	.52	.55	.58	.57	.54	.59	.45	.43	.51	.57
σ	.11	.09	.10	.09	.09	.09	.10	.10	.11	.09

APPENDIX B

Basic Skills Test Question Classifications
and Content Specifications

Word Relationships - Form VMT

Grade 4

	Subject	Relationship
1.	Geography	Characteristic of
2.	Household	Associated with
3.	Aesthetic	Cause-Effect
4.	Sports	Part-Whole
5.	Aesthetic	Object-Action
6.	Abstract	Antonyms
7.	Geography	Associated with
8.	Animals	Characteristic of
9.	Tools	Associated with
10.	Sports	Associated with
11.	Abstract	Antonyms
12.	Animals	Part-Whole
13.	Tools	Object-Action
14.	Transportation	Part-Whole
15.	Animals	Part-Whole
16.	Human Relationships	Expression of
17.	Abstract	Antonyms
18.	Household	Part-Whole
19.	General	Characteristic of
20.	Abstract	Antonyms
21.	Household	Associated with
22.	Transportation	Object-Action
23.	Human Relationships	Object-Action
24.	Human Relationships	Cause-Effect
25.	Measurement	Characteristic of
26.	Weather	Characteristic of
27.	Aesthetic	Associated with
28.	Human Relationships	Part-Whole
29.	Animals	Cause-Effect
30.	General	Antonyms
31.	Animals	Characteristic of
32.	Abstract	Antonyms
33.	Human Relationships	Related to
34.	Household	Class-Subclass
35.	Household	Associated with
36.	Weather	Associated with
37.	Household	Class-Subclass
38.	Aesthetic	Object-Action
39.	Animals	Associated with
40.	Geography	Part-Whole
41.	Geography	Associated with
42.	Sports	Associated with
43.	Household	Part-Whole
44.	Human Relationships	Expression of
45.	Household	Part-Whole

Word Relationships - Form VMT

Grade 7

	Subject	Relationship
1.	Tools	Part-Whole
2.	Human Relations	Characteristic of
3.	Aesthetic	Effect-cause
4.	Transportation	Related to
5.	Animals	Characteristic of
6.	Sports	Associated with
7.	Animals	Subclass-class
8.	General	Related to
9.	Household	Class-subclass
10.	Transportation	Associated with
11.	Human Relations	Antonyms
12.	Transportation	Subclass-class
13.	Household	Place-action
14.	General	Antonyms
15.	Tools	Associated with
16.	Animals	Class-subclass
17.	Aesthetic	Associated with
18.	Household	Related to
19.	Geography	Characteristic of
20.	Abstract	Antonyms
21.	General	Associated with
22.	Abstract	Characteristic of
23.	General	Antonyms
24.	Tools	Associated with
25.	Sports	Associated with
26.	Human Relations	Associated with
27.	General	Related to
28.	Weather	Characteristic of
29.	Geography	Place-object
30.	Household	Associated with
31.	Tools	Related to
32.	Tools	Related to
33.	Human Relations	Antonyms
34.	Abstract	Synonyms
35.	Household	Part-Whole
36.	Household	Part-part
37.	General	Associated with
38.	Household	Related to

Reading - Form VMT

Grade 4

1. Words-synonym
2. Words-synonym
3. Words-illustrative
4. Words-analysis
5. Words-illustrative
6. Words-synonym
7. Words-illustrative
8. Words-synonym
9. Words-illustrative
10. Words-synonym
11. Words-analysis
12. Words-synonym
13. Words-synonym
14. Words-synonym
15. Words-synonym
16. Sentences-inference
17. Sentences-straightforward comprehension
18. Sentences-inference
19. Sentences-straightforward comprehension
20. Sentences-inference
21. Sentences-inference
22. Sentences-straightforward comprehension
23. Sentences-straightforward comprehension
24. Sentences-inference
25. Sentences-straightforward comprehension
26. Sentences-inference

27. Sentences-straightforward comprehension

28. Sentences-inference

29. Sentences-straightforward comprehension

30. Sentences-inference

31. Passage-narrative
Item classification-fact

32. Passage-narrative
Item classification-fact

33. Passage-narrative
Item classification-inference

34. Passage-narrative
Item classification-application of ideas

35. Passage-narrative
Item classification-main idea

36. Passage-narrative
Item classification-inference

37. Passage-science
Item classification-fact

38. Passage-science
Item classification-fact

39. Passage-science
Item classification-application of ideas

40. Passage-narrative
Item classification-main idea

41. Passage-narrative
Item classification-inference

42. Passage-narrative
Item classification-inference

43. Passage-narrative
Item classification-inference

44. Passage-narrative
Item classification-main idea

45. Passage-narrative
Item classification-inference

46. Passage-narrative
Item classification-inference

47. Passage-social studies
Item classification-main idea

48. Passage-social studies
Item classification-inference

49. Passage-social studies
Item classification-inference

50. Passage-social studies
Item classification-inference

Reading - Form VMT

Grade 7

1-15 Synonyms

16-25 Sentences-words in context

26. Reading Comprehension-fact/opinion

27. Reading Comprehension-inference

28. Reading Comprehension-sequence of events

29. Reading Comprehension-fact/opinion

30. Reading Comprehension-inference

31. Reading Comprehension-fact/opinion

32. Reading Comprehension-sequence of events

33. Passage-science
Item classification-fact

34. Passage-science
Item classification-fact

35. Passage-science
Item classification-fact

36. Passage-science
Item classification-fact

37. Passage-instructional
Item classification-main idea

38. Passage-instructional
Item classification-sequence of events

39. Passage-social studies
Item classification-fact

40. Passage-social studies
Item classification-inference

41. Passage-social studies
Item classification-inference

42. Passage-social studies
Item classification-main idea

43. Passage-science
Item classification-inference

44. Passage-science
Item classification-fact

45. Passage-science
Item classification-main idea

46. Passage-narrative
Item classification-fact

47. Passage-narrative
Item classification-inference

48. Passage-narrative
Item classification-inference

49. Passage-narrative
Item classification-sequence of events

50. Passage-science
Item classification- fact

51. Passage-science
Item classification-inference

52. Passage-science
Item classification-inference

53. Passage-science
Item classification-inference

54. Passage-social studies
Item classification-inference

55. Passage-social studies
Item classification-fact

56. Passage-social studies
Item classification-fact

57. Passage-science
Item classification-fact

58. Passage-science
Item classification-fact

59. Passage-science
Item classification-main idea

60. Passage-science
Item classification-inference

Reading Test Specifications

Form VMT

		Grade 4	Grade 7
I.	Words	15 items	15 items
	A. Synonymous (BEGIN: start)	9	15
	B. Illustrative (RELUCTANT: "I'd really rather not.")	4	0
	C. Analytic (IMPRACTICAL: not practical)	2	0
II.	Sentences	15 items	10 items
	A. Inference-test word not in sentence but inferred from sentence	8	0
	B. Straightforward comprehension-tests word in sentence, underlined	7	0
	C. Words in Context	0	10
III.	Reading Comprehension		
	A. Items	20 items	35 items
	1. Fact	4	12
	2. Inference	10	12
	3. Main idea	4	4
	4. Application of ideas	2	0
	5. Sequence of events	0	4
	6. Fact/Opinion	0	3
	B. Passage Content	6 passages	8 passages
	1. Narrative	4	1
	2. Social Studies	1	2
	3. Science	1	4
	4. Instructional	0	1

Mechanics of Written English - Form VMT

Spelling - Grade 4

1. Spelling by sound alone
2. Misunderstanding of rules for word formation
3. No error
4. Spelling by sound alone
5. Misunderstanding of rules for word transformation
6. No error
7. Reversing of letters
8. Spelling by sound alone
9. Misunderstanding of rules for word formation
10. No error
11. Spelling by sound alone
12. No error
13. Misunderstanding of rules for word transformation
14. No error
15. Misunderstanding of rules for word formation

Effectiveness of Expression - Grade 4

16.-43. Questions testing effectiveness of expression ask the student to demonstrate his sensitivity to language by selecting the wording which, in addition to being grammatically correct, is best in sentence structure and word order and is most precise and appropriate in idiom and diction.

Punctuation and Capitalization - Grade 4

44. Capital letter - first word of sentence, proper noun; period at end of sentence
45. Apostrophe - possessive, contraction
46. Capital letter - first word of sentence, first person "I"; comma in date
47. Capital letter - first word of sentence; question mark
48. Comma - direct address; capital letter - proper noun
49. Capital letter - proper noun
50. Apostrophe - contraction
51. Period - abbreviation; comma - address
52. Capital letter - proper noun
53. Capital letter - first word of sentence, proper noun
54. Comma - direct address (letter greeting)
55. Comma - in quotation; quotation marks - direct quote

Mechanics of Written English - Form VMT

Spelling - Grade 7

1. Common mispronunciation
2. Spelling by sound alone
3. No error
4. Misunderstanding of rules for word formation
5. Misunderstanding of rules for word formation
6. No error
7. Misunderstanding of rules for word transformation
8. No error
9. Misunderstanding of rules for word formation
10. Misunderstanding of rules for word formation
11. No error
12. Misunderstanding of rules for word formation
13. No error
14. Misunderstanding of rules for word transformation
15. Spelling by sound alone
16. No error
17. Common mispronunciation
18. Misunderstanding of rules for word transformation
19. No error
20. Misunderstanding of rules for word formation

Effectiveness of Expression - Grade 7

21.-50. Questions testing effectiveness of expression ask the student to demonstrate his or her sensitivity to language by selecting the wording which, in addition to being grammatically correct, is best in sentence structure and word order and is most precise and appropriate in idiom and diction.

51. Capital letter - personal title, common/proper noun

52. Capital letter - common/proper noun; unnecessary comma

53. Comma - in series; capital letter - proper name

54. Comma - appositively; unnecessary comma

55. Quotation marks - title; comma - appositively; unnecessary comma; capital letter - common/proper name

56. Hyphen - compound adjective; quotation marks - direct quote; capital letter - direct quote; end punctuation

57. Apostrophe - in plural form; capital letter - proper name; comma - with conjunction; period - end of sentence

58. Apostrophe - in possessive; capital letter - in personal title; period - in abbreviation

59. Capital letter - common/proper noun; comma - after introductory phrase; apostrophe - in contraction

60. Apostrophe - in possessive; question mark

61. Capital letter - common/proper noun; unnecessary semicolon; capital letter - proper name

62. Comma - in date; capital letter - common/proper noun

63. Comma - after introductory clause; capital letter - proper noun; colon/comma confusion

64. Capital letter - proper name; comma - apposition; period - end of sentence

Mechanics of Written English Test Content Specifications

Form VMT

		Grade 4	Grade 7
I.	Spelling	15 items	20 items
	A. Misunderstanding of rules for word formation	3	6
	B. Misunderstanding of rules for word transformation	2	3
	C. Reversing of letters	1	0
	D. Common mispronunciation	0	2
	E. Spelling by sound alone	4	2
	F. No error	5	7
II.	Effectiveness of Expression	28 items	30 items
	Questions testing effectiveness of expression ask the student to demonstrate his sensitivity to language by selecting the wording which, in addition to being grammatically correct, is best in sentence structure and word order, and is most precise and appropriate in idiom and diction.		
III.	Punctuation and Capitalization	12 sentences	14 sentences
	A. Capital letters		
	1. First word of sentence	4	0
	2. Proper names	5	11
	3. First person "I"	1	0
	4. In personal titles	0	2
	5. In quotations	0	1
	B. Period		
	1. End of sentence	1	2
	2. Abbreviation	1	1
	C. Question mark	1	1
	D. Other end punctuation	0	1

III. Punctuation and Capitalization (Cont'd.)

	Grade 4	Grade 7
E. Comma		
1. Address, date	2	1
2. Direct address	2	0
3. Series	0	1
4. With quotations	1	0
5. Apposition	0	3
6. Unnecessary	0	3
F. Quotation marks		
1. Title of short publication	0	1
2. Direct address, direct quote	1	1
G. Apostrophe		
1. Possessive	1	2
2. Contraction	2	1
H. Colon	0	1
I. Semicolon	0	1

Grade 4

1. Number and Operations - operations with integers
2. Number and Operations - operations with integers
3. Number and Operations - place value
4. Applications - word problems
5. Geometry and Measurement - properties of polygons and the circle
6. Mathematical Sentences - equations
7. Number and Operations - place value
8. Applications - word problems
9. Number and Operations - operations with integers
10. Geometry and Measurement - units of measure
11. Geometry and Measurement - perimeters and areas of simple polygons
12. Number and Operations - operations with integers
13. Number and Operations - operations with integers
14. Number and Operations - estimation
15. Relations, Functions, Graphs - reading and interpreting graphs
16. Applications - word problems
17. Applications - word problems
18. Mathematical Sentences - inequalities
19. Relations, Functions, Graphs - use of mathematical formula
20. Number and Operations - place value
21. Geometry and Measurement - scale drawings and maps
22. Number and Operations - properties of operations
23. Number and Operations - operations with integers
24. Number and Operations - special properties of zero and one
25. Logical Thinking - intuitive ideas
26. Geometry and Measurement - angles and intuitive ideas of geometry
27. Number and Operations - properties of operations
28. Applications - word problems
29. Number and Operations - operations and integers
30. Number and Operations - place value
31. Number and Operations - special properties of zero and one
32. Number and Operations - proper fractions
33. Mathematical Sentences - evaluations
34. Number and Operations - proper fractions
35. Number and Operations - proper fractions
36. Number and Operations - properties of integers
37. Geometry and Measurement - units of measure
38. Applications - word problems
39. Applications - word problems
40. Applications - word problems

Mathematics - Form VMT

Grade 7

1. Number and Operations - operations with intergers
2. Number and Operations - special properties of zero and one
3. Mathematical Sentences -inequalities
4. Number and Operations - special properties of zero and one
5. Number and Operations - properties of operations
6. Number and Operations - operations with integers
7. Number and Operations - proper fractions
8. Number and Operations - properties of integers, divisibility
9. Applications - word problems
10. Geometry and Measurement - perimeters and areas of simple polygons
11. Relations, Functions, Graphs - use of mathematical formula
12. Number and Operations - place value
13. Geometry and Measurement - units of measure
14. Number and Operations - properties of operations
15. Mathematical Sentences - inequalities
16. Geometry and Measurement - non-metric geometry
17. Number and Operations - operations with integers
18. Application - translation of phrases
19. Number and Operations - decimals and per cents
20. Geometry and Measurement - perimeters and areas of simple polygons
21. Geometry and Measurement - scale drawings and maps
22. Logical Thinking - intuitive ideas
23. Geometry and Measurement - non-metric geometry
24. Applications - word problems
25. Relations, Functions, Graphs - reading and interpreting graphs
26. Mathematical Sentences - equations
27. Relations, Functions, Graphs - reading and interpreting graphs
28. Geometry and Measurements - perimeters and areas of simple polygons
29. Geometry and Measurement - units of measure
30. Number and Operations - average
31. Relations, Functions, Graphs - reading and interpreting graphs
32. Applications - word problems
33. Applications - word problems
34. Geometry and Measurement - units of measure
35. Applications - word problems
36. Number and Operations - proper fractions
37. Geometry and Measurement - units of measure
38. Number and Operations - estimation
39. Number and Operations - properties of integers, divisibility
40. Number and Operations - proper fractions

Mathematics Test Content Specifications

FORM VMT

		Grade 4	Grade 7
I.	NUMBER AND OPERATIONS	20 Items	16 Items
	A. Operations with integers	7	3
	B. Place value	4	1
	C. Properties of integers, divisibility	1	2
	D. Proper fractions	3	3
	E. Decimals and percents	0	1
	F. Properties of operations (commutative, associative, distributive, closure)	2	2
	G. Estimation	1	1
	H. Special properties of zero and one	2	2
	I. Average	0	1
II.	GEOMETRY AND MEASUREMENT	6 Items	10 Items
	A. Units of measure: length, weight, time temperature, money	2	4
	B. Perimeters and areas of simple polygons	1	3
	C. Scale drawings and maps	1	1
	D. Properties of polygons and the circle	1	0
	E. Angles and intuitive ideas of geometry	1	0
	F. Non-metric geometry	0	2
III.	RELATIONS, FUNCTIONS, GRAPHS	2 Items	4 Items
	A. Use of mathematical formula	1	1
	B. Reading and interpreting graphs	1	3
IV.	LOGICAL THINKING	1 Item	1 Item
	A. Intuitive ideas: Counterexample reasoning	1	1
V.	MATHEMATICAL SENTENCES	3 Items	3 Items
	A. Equations	2	1
	B. Inequalities	1	2
VI.	APPLICATIONS	8 Items	6 Items
	A. Translation of phrases	0	1
	B. Word problems (other than those already listed in one of the categories above)	8	5

Note: At least one-third of the problems could be classified as applications.

APPENDIX C

Participants on the Item Development Committees

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Fourth Grade

Seventh Grade

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Romeo, Michigan

Mr. Dave Thomas
Mathematics Department Chairman
Brownell Middle School
Grosse Points Woods, Michigan

Mr. William Schewe
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MacDonald Middle School
Lansing, Michigan

APPENDIX D

Correlation Tables

MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM
1972-73 CORRELATION TABLES*

DISTRICT MEAN CORRELATIONS

Unweighted, Grades 4 and 7

Weighted, Grades 4 and 7

SCHOOL MEAN CORRELATIONS

Unweighted, Grade 4

Unweighted, Grade 7

Weighted, Grade 4

Weighted, Grade 7

*See Local District and School Report: Explanatory Materials for definition of variables.

CORRELATIONS AMONG DISTRICT MEANS BASED UPON DATA FROM THE 1972-73 MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM, UNWEIGHTED

INTERPRETATION OF SYMBOLS USED IN CORRELATION TABLES

SYMBOL	INTERPRETATION
PIS/K	Professional instruction staff per 1,000 pupils
T/K	Teachers per 1,000 pupils
AVG EXP	Average years teaching experience
% MAST	Percent of teachers with master's degree
AVG SAL	Average contracted salary of teachers
SEV/P	State equalized valuation per resident member (1971-72)
LR/P	Local revenue per pupil (1971-72)
SSA/P	State school aid per pupil (1971-72)
IE/P	K-12 instructional expense per pupil (1971-72)
EIE/P	Elementary instructional expense per pupil (1971-72)
TCOE/P	Total current operating expense per pupil (1971-72)
% MNRTY	Percent of racial-ethnic minority students
MIL	Total operating millage (1971-72)
D O RAT	School dropout rate (1971-72)
4 WRD R	Word relationships, Grade 4
4 READ	Reading, Grade 4
4 ENG	Mechanics of Written English, Grade 4
4 MATH	Mathematics, Grade 4
4 COMP	Basic skills composite achievement, Grade 4
7 WRD R	Word relationships, Grade 7
7 READ	Reading, Grade 7
7 ENG	Mechanics of Written English, Grade 7
7 MATH	Mathematics, Grade 7
7 COMP	Basic skills composite achievement, Grade 7
4 MEM	Grade 4 membership
7 MEM	Grade 7 membership
TOT MEM	Total membership

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

UNWEIGHTED

THE NUMBER OF OBSERVATIONS IS 528.

VARIABLE	SUMS	SUMS OF SQUARES	MEAN	SIGMA(N)	SIGMA(N-1)
PTS/K	25524.5969	1249968.0348	48.3420	5.5146	5.5198
T/K	22554.7968	977737.8702	42.7174	5.1960	5.2009
AVG EXP	4578.4998	43124.6083	8.6714	2.5460	2.5484
% MAST	13191.3976	406862.1637	24.9837	12.0990	12.1105
AVG SAL	5758755.0000	0.63728740 11	10904.7330	1319.0785	1320.9299
SEV/P	9181587.6201	0.20150960 12	17389.3708	8902.6318	8911.0743
LR/P	237502.4785	0.12937900 09	449.8153	206.6451	206.8410
SSA/P	202378.8766	0.85088950 08	383.2933	119.3296	119.4427
IC/P	307379.1169	0.18397730 09	582.1574	97.6448	97.7374
EIE/P	268678.5559	0.14211270 09	508.8609	101.0612	101.1570
TCUE/P	419452.5171	0.34137040 09	794.4176	124.2392	124.3570
% ANKTY	2724.8996	81061.3902	5.1608	11.2646	11.2753
MIL	11957.3475	283050.5340	22.6465	4.8184	4.8230
D O RAT	2590.4498	16220.8406	4.9062	2.5789	2.5814
4 WRD R	26107.2966	1294975.2123	49.4456	2.7809	2.7836
4 READ	26781.9970	1361684.1344	50.7235	2.4649	2.4673
4 ENG	26597.4966	1343116.1695	50.3740	2.4972	2.4996
4 MATH	27340.3967	1418929.7747	51.7811	2.4677	2.4700
4 COMP	26913.7966	1374926.6183	50.9731	2.4022	2.4045
7 WRD R	26047.5967	1288334.8961	49.3326	2.5151	2.5175
7 READ	26620.4968	1344889.0058	50.4176	2.2810	2.2832
7 ENG	26356.7968	1318677.8249	49.9182	2.3815	2.3838
7 MATH	27008.6968	1385171.5064	51.1528	2.6112	2.6137
7 COMP	26670.3969	1350031.6877	50.5121	2.3247	2.3269
4 MEM	163431.0000	0.55464400 09	309.5284	977.0641	977.9904
7 MEM	168946.0000	0.55086560 09	319.9735	970.0118	970.9317
TOT MEM	2114743.0000	0.90648290 11	4005.1951	12475.6071	12487.4380

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

CORRELATION MATRIX

	PIS/K	T/K	AVG EXP	% MAST	AVG SAL	SEV/P	LR/P	SSA/P	IE/P	EIE/P
PIS/K	1.0000	0.9285	0.1272	0.1156	-0.0829	0.3134	0.4205	-0.2511	0.4564	0.3157
T/K	0.9285	1.0000	0.1280	0.0101	-0.1984	0.2918	0.3389	-0.2186	0.2955	0.1892
AVG EXP	0.1272	0.1280	1.0000	0.3769	0.3764	0.3394	0.3666	-0.3176	0.3769	0.3923
% MAST	0.1156	0.0101	0.3769	1.0000	0.7072	0.3017	0.5047	-0.3446	0.6466	0.5059
AVG SAL	-0.0829	-0.1984	0.3764	0.7072	1.0000	0.2669	0.4643	-0.3258	0.6527	0.5394
SEV/P	0.3134	0.2918	0.3394	0.3017	0.2669	1.0000	0.8691	-0.9334	0.5164	0.3996
LR/P	0.4205	0.3389	0.3666	0.5047	0.4643	0.8691	1.0000	-0.8789	0.7583	0.5515
SSA/P	-0.2511	-0.2186	-0.3176	-0.3446	-0.3258	-0.9334	-0.8789	1.0000	-0.4922	-0.3663
IE/P	0.4564	0.2955	0.3769	0.6466	0.6527	0.5164	0.7583	-0.4922	1.0000	0.7672
EIE/P	0.3157	0.1892	0.3923	0.5059	0.5394	0.3996	0.5515	-0.3663	0.7672	1.0000
TCOE/P	0.3342	0.4648	0.3747	0.5737	0.5432	0.5771	0.8161	-0.5343	0.9493	0.7198
% PNRTY	0.1137	0.0567	0.2156	0.0783	0.1854	0.1923	0.1936	-0.0845	0.3657	0.3513
MIL	0.1970	0.0778	0.0725	0.4515	0.4602	-0.0168	0.3822	-0.0905	0.5459	0.3515
D U RAT	-0.1870	-0.2294	-0.0094	0.0119	0.0972	-0.0325	-0.0461	0.0551	0.0678	0.0337
4 WRD R	0.0868	0.0938	0.0624	0.1895	0.1477	0.0568	0.1430	-0.1324	0.0795	0.0913
4 READ	-0.0743	0.0973	0.0598	0.1605	0.1250	0.0634	0.1414	-0.1482	0.0668	0.0450
4 ENG	0.0869	0.1256	0.1061	0.1516	0.1031	0.0644	0.1274	-0.1293	0.0441	0.0410
4 MATH	0.1388	0.1541	0.1171	0.2001	0.1470	0.0728	0.1618	-0.1442	0.1030	0.0823
4 COMP	0.1031	0.1292	0.0978	0.1769	0.1337	0.0690	0.1517	-0.1304	0.0752	0.0588
7 WRD R	0.1208	0.1188	0.0855	0.2552	0.1423	0.0919	0.1719	-0.1968	0.1098	0.0586
7 READ	-0.0676	0.0915	-0.0409	0.1538	0.0476	0.0610	0.1062	-0.1510	0.0009	-0.0417
7 ENG	0.0932	0.1387	0.1137	0.1523	0.0293	0.0851	0.1100	-0.1487	0.0148	-0.0145
7 MATH	0.0968	0.1376	0.1111	0.1836	0.0359	0.0876	0.1198	-0.1414	0.0177	-0.0226
7 COMP	0.0920	0.1280	0.0958	0.1738	0.0403	0.0773	0.1210	-0.1585	0.0158	-0.0238
4 MEM	-0.0818	-0.1361	0.0535	0.2022	0.2568	0.0458	0.0966	-0.0532	0.2378	0.2154
7 MEM	-0.0827	-0.1342	0.0579	0.2149	0.2700	0.0500	0.1032	-0.0583	0.2466	0.2234
TOT MEM	-0.0815	-0.1375	0.0597	0.2127	0.2671	0.0507	0.1041	-0.0587	0.2453	0.2229

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

CORRELATION MATRIX

	TCOE/P	% MNRTY	PIL	D C RAT	4 WRD R	4 READ	4 ENG	4 MATH	4 COMP	7 WRD R
PTS/K	0.5342	0.1137	0.1970	-0.1870	0.0868	0.0743	0.0869	0.1388	0.1031	0.1208
T/K	0.4048	0.0567	0.0778	-0.2294	0.0938	0.0973	0.1256	0.1541	0.1292	0.1168
AVG EXP	0.3747	0.2156	0.0725	-0.0694	0.0624	0.0598	0.1041	0.1171	0.0978	0.0855
% MAST	0.5737	0.0783	0.4515	0.0119	0.1895	0.1605	0.1516	0.2001	0.1769	0.2552
AVG SAL	0.5432	0.1854	0.4602	0.0972	0.1477	0.1350	0.1031	0.1470	0.1337	0.1423
SEV/P	0.5771	0.1923	-0.0168	-0.0325	0.0568	0.0634	0.0644	0.0728	0.0690	0.0919
LR/P	0.8101	0.1936	0.3822	-0.0461	0.1430	0.1414	0.1274	0.1698	0.1917	0.1779
SSA/P	-0.5343	-0.0845	-0.0905	0.0551	-0.1324	-0.1482	-0.1393	-0.1482	-0.1504	-0.1968
IE/P	0.9493	0.3657	0.5459	0.0678	0.0795	0.0668	0.0441	0.1030	0.0752	0.1098
EIE/P	0.7198	0.3913	0.3515	0.0337	0.0913	0.0450	0.0410	0.0823	0.0588	0.0586
TCOE/P	1.0000	0.3496	0.5060	0.0280	0.0766	0.0739	0.0567	0.1115	0.0849	0.0991
% MNRTY	0.3496	1.0000	0.0809	0.3470	-0.4005	-0.4317	-0.3994	-0.3972	-0.4219	-0.5183
MIL	0.5060	0.0809	1.0000	0.0306	0.1347	0.1324	0.0954	0.1612	0.1361	0.1384
D C RAT	0.0280	0.3470	0.0306	1.0000	-0.3605	-0.3618	-0.3753	-0.3411	-0.3695	-0.4100
4 WRD R	0.0766	-0.4005	0.1347	-0.3605	1.0000	0.9123	0.9119	0.8906	0.9340	0.6294
4 READ	0.0739	-0.4317	0.1324	-0.3618	0.9123	1.0000	0.9362	0.8908	0.9728	0.6296
4 ENG	0.0567	-0.3994	0.0954	-0.3753	0.9119	0.9362	1.0000	0.8952	0.9742	0.6196
4 MATH	0.1115	-0.3972	0.1612	-0.3411	0.8906	0.8908	0.8952	1.0000	0.9577	0.6179
4 COMP	0.0849	-0.4219	0.1361	-0.3695	0.9340	0.9728	0.9742	0.9577	1.0000	0.6425
7 WRD R	0.0991	-0.5183	0.1384	-0.4100	0.6294	0.6296	0.6196	0.6179	0.6425	1.0000
7 READ	0.0072	-0.5557	0.0626	-0.4308	0.5975	0.6427	0.6210	0.6038	0.6426	0.9235
7 ENG	0.0325	-0.4523	0.0121	-0.4175	0.5803	0.6117	0.6292	0.5870	0.6279	0.8726
7 MATH	0.0371	-0.5037	0.0395	-0.4757	0.6072	0.6240	0.6245	0.6198	0.6414	0.8551
7 COMP	0.0814	-0.5219	0.0416	-0.4587	0.6197	0.6514	0.6562	0.6278	0.6626	0.9181
4 MEM	0.1932	0.3653	0.1273	0.2240	-0.0949	-0.1182	-0.1118	-0.1194	-0.1218	-0.0862
7 MEM	0.2008	0.2979	0.1364	0.2204	-0.0859	-0.1091	-0.1089	-0.1106	-0.1124	-0.0755
TOT MEM	0.2000	0.3016	0.1329	0.2211	-0.0890	-0.1122	-0.1118	-0.1131	-0.1153	-0.0792

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

CORRELATION MATRIX

	7 READ	7 ENG	7 MATH	7 COMP	4 MEM	7 MEM	TOT MEM
PIS/K	0.0876	0.0932	0.0968	0.0920	-0.0818	-0.0827	-0.0815
T/K	0.0915	0.1307	0.1376	0.1280	-0.1361	-0.1392	-0.1375
AVG EXP	0.0409	0.1137	0.1111	0.0958	0.0535	0.0579	0.0547
% MAST	0.1838	0.1523	0.1836	0.1738	0.2022	0.2149	0.2127
AVG SAL	0.0476	0.0293	0.0359	0.0403	0.2568	0.2700	0.2671
SEV/P	0.0610	0.0851	0.0676	0.0773	0.0458	0.0500	0.0507
LR/P	0.1062	0.1100	0.1198	0.1210	0.0966	0.1052	0.1041
SSA/P	-0.1510	-0.1487	-0.1474	-0.1585	-0.0532	-0.0583	-0.0567
IE/P	← 0.0089	0.0148	0.0177	0.0158	0.2378	0.2466	0.2453
EIE/P	-0.0417	-0.0145	-0.0226	-0.0238	0.2154	0.2234	0.2229
TCOE/P	0.0872	0.0325	0.0371	0.0314	0.1932	0.2008	0.2000
% MNRTY	-0.5557	-0.4523	-0.5037	-0.5219	0.3053	0.2979	0.3016
MIL	0.0624	0.0121	0.0395	0.0416	0.1273	0.1364	0.1329
D O RAT	-0.4368	-0.4175	-0.4757	-0.4587	0.2240	0.2204	0.2211
4 WRD R	0.5975	0.5803	0.6072	0.6197	-0.0949	-0.0859	-0.0890
4 READ	0.6437	0.6117	0.6260	0.6514	-0.1182	-0.1091	-0.1122
4 ENG	0.6210	0.6292	0.6245	0.6502	-0.1178	-0.1089	-0.1118
4 MATH	0.6038	0.5870	0.6190	0.6273	-0.1194	-0.1106	-0.1131
4 COMP	0.6426	0.6279	0.6414	0.6626	-0.1216	-0.1124	-0.1154
7 WRD R	0.9235	0.8726	0.8551	0.9181	-0.0862	-0.0795	-0.0792
7 READ	1.0000	0.9194	0.8771	0.9654	-0.1438	-0.1345	-0.1376
7 ENG	0.9194	1.0000	0.8700	0.9646	-0.1220	-0.1135	-0.1159
7 MATH	0.8771	0.8700	1.0000	0.9553	-0.1286	-0.1199	-0.1225
7 COMP	← 0.9654	0.9646	0.9553	1.0000	-0.1330	-0.1239	-0.1266
4 MEM	-0.1438	-0.1220	-0.1286	-0.1330	1.0000	0.9989	0.9994
7 MEM	-0.1345	-0.1135	-0.1199	-0.1239	0.9989	1.0000	0.9996
TOT MEM	-0.1376	-0.1159	-0.1225	-0.1266	0.9994	0.9996	1.0000

CORRELATIONS AMONG DISTRICT MEANS BASED UPON DATA FROM THE 1972-73 MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM, WEIGHTED ACCORDING TO TOTAL DISTRICT MEMBERSHIP

INTERPRETATION OF SYMBOLS USED IN CORRELATION TABLES

SYMBOL	INTERPRETATION
PIS/K	Professional instructional staff per 1,000 pupils
T/K	Teachers per 1,000 pupils
AVG EXP	Average years teaching experience
% MAST	Percent of teachers with master's degree
AVG SAL	Average contracted salary of teachers in thousands
SEV/P	State equalized valuation per resident member (1971-72)
LR/P	Local revenue per pupil (1971-72)
SSA/P	State school aid per pupil (1971-72)
IE/P	K-12 instructional expense per pupil (1971-72)
EIE/P	Elementary instructional expense per pupil (1971-72)
TCOE/P	Total current operating expense per pupil (1971-72)
% MNRTY	Percent of racial-ethnic minority students
MIL	Total operating millage
D O RAT	School dropout rate (1971-72)
4 WRD R	Word relationships, Grade 4
4 READ	Reading, Grade 4
4 ENG	Mechanics of Written English, Grade 4
4 MATH	Mathematics, Grade 4
4 COMP	Basic skills composite achievement, Grade 4
7 WRD R	Word relationships, Grade 7
7 READ	Reading, Grade 7
7 ENG	Mechanics of Written English, Grade 7
7 MATH	Mathematics, Grade 7
7 COMP	Basic skills composite achievement, Grade 7

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

WEIGHTED BY DISTRICT ENROLLMENT

THE NUMBER OF OBSERVATIONS IS 2114743.

VARIABLE	SUMS	SUMS OF SQUARES	MEAN	SIGMA(N)	SIGMA(N-1)
PIS/K	0.9926967D 08	0.47046300 10	46.9417	4.5997	4.5997
T/K	0.8563182D 08	0.34993200 10	40.4928	3.8808	3.8808
AVG EXP	0.1931533D 08	0.1849973D 09	9.1337	2.0140	2.0140
% MAST	0.6978709D 08	0.2610740D 10	33.0003	12.0634	12.0634
AVG SAL	0.2538695D 08	0.3085801D 09	12.0047	1.3434	1.3434
SEV/P	0.3974801D 11	0.8654071D 15	18795.6681	7479.8757	7479.8775
LR/P	0.1092966D 10	0.6589524D 12	516.8316	210.9131	210.9132
SSA/P	0.7644550D 09	0.2988740D 12	361.4884	103.2228	103.2228
IE/P	0.1368919D 10	0.9396246D 12	656.7789	113.8527	113.8528
SIE/P	0.1224472D 10	0.7376722D 12	579.0171	116.4591	116.4592
TCOE/P	0.1843639D 10	0.1649977D 13	871.8031	142.0744	142.0744
% MNRTY	0.3329160D 08	0.1759585D 10	15.7426	24.5589	24.5589
MIL	0.5211069D 08	0.1334465D 10	24.6416	4.8806	4.8806
D O RAT	0.1413191D 08	0.1265186D 09	6.6826	3.8949	3.8949
4 WRD R	0.1029347D 09	0.5034131D 10	48.6748	3.3548	3.3548
4 READ	0.1054448D 09	0.5279005D 10	49.8617	3.1771	3.1771
4 ENG	0.1046896D 09	0.5202097D 10	49.5046	3.0349	3.0349
4 MATH	0.1076657D 09	0.5502607D 10	50.9120	3.1614	3.1614
4 COMP	0.1059702D 09	0.5330593D 10	50.1102	3.1063	3.1063
7 WRD R	0.1030131D 09	0.5042720D 10	48.7119	3.4217	3.4217
7 READ	0.1045526D 09	0.5192047D 10	49.4399	3.2966	3.2966
7 ENG	0.1037460D 09	0.5107796D 10	49.0584	2.9319	2.9319
7 MATH	0.1060687D 09	0.5345156D 10	50.1568	3.4447	3.4447
7 COMP	0.1048815D 09	0.5222584D 10	49.5954	3.1470	3.1470

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

CORRELATION MATRIX WEIGHTED BY DISTRICT ENROLLMENT

	PIS/K	T/K	AVG EXP	% MAST	AVG SAL	SEV/P	LR/P	SSA/P	IE/P	EIE/P
PIS/K	1.0000	0.9070	0.0127	0.1634	-0.0450	0.3261	0.4858	-0.3325	0.3740	0.1969
T/K	0.9070	1.0000	-0.0444	-0.0259	-0.2221	0.2179	0.3312	-0.2410	0.1071	-0.0344
AVG EXP	0.0127	-0.0444	1.0000	0.5640	0.5251	0.4008	0.3673	-0.3233	0.4794	0.4849
% MAST	0.1634	-0.0259	0.5640	1.0000	0.7984	0.5137	0.6332	-0.4884	0.7373	0.5933
AVG SAL	-0.0450	-0.2221	0.5251	0.7984	1.0000	0.4645	0.5519	-0.4262	0.7270	0.6572
SEV/P	0.3281	0.2179	0.4008	0.5137	0.4645	1.0000	0.8867	-0.9312	0.6128	0.4809
LR/P	0.4858	0.3312	0.3673	0.6332	0.5519	0.8867	1.0000	-0.8854	0.7445	0.5174
SSA/P	-0.3325	-0.2410	-0.3233	-0.4884	-0.4262	-0.9312	-0.8854	1.0000	-0.5229	-0.3439
IE/P	0.3740	0.1071	0.4794	0.7373	0.7270	0.6126	0.7445	-0.5229	1.0000	0.8319
EIE/P	0.1969	-0.0344	0.4849	0.5933	0.6572	0.4809	0.5174	-0.3439	0.8319	1.0000
TCOE/P	0.4092	0.1617	0.4693	0.7172	0.6883	0.6752	0.8009	-0.5696	0.9739	0.8029
% MNRTY	-0.2093	-0.3615	0.2578	0.2146	0.3687	0.1394	0.0231	0.0543	0.4754	0.6193
MIL	0.3480	0.2245	0.0415	0.4320	0.3779	0.0844	0.4545	-0.2025	0.4610	0.2249
D O RAT	-0.3591	-0.4802	0.2306	0.1321	0.2760	0.0191	-0.1080	0.1309	0.3193	0.4404
4 MRD R	0.3361	0.4012	-0.1532	0.0298	-0.1009	0.0897	0.2367	-0.2784	-0.1750	-0.3061
4 READ	0.3065	0.3911	-0.1545	0.0097	-0.1122	0.0717	0.2156	-0.2529	-0.2098	-0.3439
4 ENG	0.2945	0.3876	-0.1439	-0.0010	-0.1159	0.0512	0.1872	-0.2295	-0.2251	-0.3465
4 MATH	0.3433	0.4253	-0.1249	0.0258	-0.1101	0.0844	0.2319	-0.2620	-0.1925	-0.3296
4 COMP	0.3195	0.4064	-0.1426	0.0127	-0.1136	0.0704	0.2158	-0.2515	-0.2093	-0.3438
7 MRD R	0.3166	0.3712	-0.1226	0.0947	-0.0682	0.0885	0.2445	-0.2812	-0.1561	-0.3109
7 READ	0.3030	0.3860	-0.1481	0.0184	-0.1475	0.0479	0.1883	-0.2392	-0.2422	-0.3929
7 ENG	0.2762	0.3620	-0.1017	0.0420	-0.1144	0.0525	0.1827	-0.2317	-0.2228	-0.3539
7 MATH	0.3033	0.3892	-0.0930	0.0491	-0.1247	0.0779	0.2136	-0.2585	-0.2075	-0.3579
7 COMP	0.2977	0.3817	-0.1112	0.0429	-0.1253	0.0642	0.2019	-0.2500	-0.2206	-0.3670

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

CORRELATION MATRIX WEIGHTED BY DISTRICT ENROLLMENT

	TCOE/P	% MNRTY	MIL	D O RAT	4 WRD R	4 READ	4 ENG	4 MATH	4 COMP	7 WRD R
PIS/K	0.4092	-0.2093	0.3480	-0.3591	0.3361	0.3065	0.2949	0.3433	0.3195	0.3168
T/K	0.1617	-0.3615	0.2245	-0.4802	0.4012	0.3911	0.3876	0.4253	0.4064	0.3712
AVG EXP	0.4693	0.2578	0.0415	0.2306	-0.1532	-0.1545	-0.1439	-0.1249	-0.1426	-0.1226
% MAST	0.7172	0.2146	0.4320	0.1321	0.0298	0.0097	-0.0010	0.0258	0.0127	0.0947
AVG SAL	0.6883	0.3687	0.3779	0.2760	-0.1009	-0.1122	-0.1159	-0.1101	-0.1136	-0.0682
SEV/P	0.6752	0.1394	0.0844	0.0191	0.0897	0.0717	0.0512	0.0844	0.0704	0.0885
LR/P	0.8009	0.0231	0.4545	-0.1080	0.2367	0.2156	0.1872	0.2319	0.2158	0.2445
SSA/P	-0.5696	0.0543	-0.2025	0.1309	-0.2784	-0.2529	-0.2295	-0.2620	-0.2515	-0.2812
IE/P	0.5735	0.4754	0.4610	0.3193	-0.1750	-0.2098	-0.2251	-0.1925	-0.2093	-0.1561
EIE/P	0.8029	0.6193	0.2249	0.4404	-0.3061	-0.3439	-0.3465	-0.3296	-0.3438	-0.3109
TCOE/P	1.0000	0.4467	0.4493	0.2831	-0.1502	-0.1776	-0.1937	-0.1610	-0.1771	-0.1392
% MNRTY	0.4467	1.0000	-0.1632	0.8191	-0.7773	-0.8005	-0.7892	-0.8065	-0.8081	-0.8160
MIL	0.4493	-0.1632	1.0000	-0.2141	0.2634	0.2485	0.2420	0.2709	0.2596	0.2966
D O RAT	0.2831	0.8191	-0.2141	1.0000	-0.7682	-0.7917	-0.7862	-0.7946	-0.7993	-0.7936
4 WRD R	-0.1502	-0.7773	0.2634	-0.7682	1.0000	0.9709	0.9680	0.9628	0.9761	0.9073
4 READ	-0.1776	-0.8005	0.2485	-0.7917	0.9709	1.0000	0.9806	0.9686	0.9922	0.9096
4 ENG	-0.1937	-0.7892	0.2420	-0.7862	0.9680	0.9806	1.0000	0.9684	0.9916	0.8976
4 MATH	-0.1610	-0.8065	0.2709	-0.7946	0.9628	0.9686	0.9684	1.0000	0.9882	0.8983
4 COMP	-0.1771	-0.8081	0.2596	-0.7993	0.9761	0.9922	0.9916	0.9882	1.0000	0.9106
7 WRD R	-0.1392	-0.8160	0.2966	-0.7936	0.9073	0.9096	0.8976	0.8983	0.9106	1.0000
7 READ	-0.2178	-0.8592	0.2433	-0.8199	0.9051	0.9172	0.9042	0.9043	0.9174	0.9755
7 ENG	-0.2030	-0.8089	0.2222	-0.7931	0.8946	0.9013	0.9007	0.8903	0.9054	0.9625
7 MATH	-0.1757	-0.6275	0.2356	-0.8128	0.8986	0.9049	0.8984	0.9058	0.9115	0.9579
7 COMP	-0.1967	-0.8379	0.2576	-0.8145	0.9099	0.9175	0.9108	0.9100	0.9213	0.9766

MICHIGAN ASSESSMENT K-12 DISTRICT CORRELATIONS 73

CORRELATION MATRIX WEIGHTED BY DISTRICT ENROLLMENT

	7 READ	7 ENG	7 MATH	7 COMP
PIS/K	0.3030	C.2762	0.3033	0.2977
T/K	0.3860	0.3620	0.3692	0.3817
AVG EXP	-0.1481	-0.1017	-C.0930	-0.1112
% MAST	C.0184	0.0420	0.0491	0.0429
AVG SAL	-0.1475	-0.1144	-0.1247	-0.1253
SEV/P	0.0479	0.0525	0.0779	0.0642
LR/P	0.1863	0.1827	0.2136	0.2019
SSA/P	-0.2392	-0.2317	-C.2585	-0.2500
IE/P	-0.2422	-0.2228	-C.2075	-0.2206
EIE/P	-C.3929	-0.3539	-C.3579	-0.3670
TCGE/P	-0.2178	-0.2030	-0.1797	-0.1967
% MNRTY	-0.8592	-0.8089	-0.8275	-0.8379
MIL	0.2433	0.2222	0.2356	0.2376
D O RAT	-C.8199	-0.7931	-0.8128	-0.8145
4 WRD R	0.9051	0.8946	0.8986	0.9099
4 READ	0.9172	C.9013	0.9049	0.9175
4 ENG	0.9042	C.9007	0.8984	0.9108
4 MATH	C.9043	C.8903	0.9058	0.9100
4 COMP	0.9174	C.9054	0.9115	0.9213
7 WRD R	0.9755	0.9625	0.9579	0.9766
7 READ	1.0000	0.9755	0.9663	0.9909
7 ENG	C.9755	1.0000	0.9600	0.9883
7 MATH	C.9663	C.9600	1.0000	0.9872
7 COMP	C.9909	C.9883	0.9872	1.0000

CORRELATIONS AMONG SCHOOL MEANS BASED UPON DATA FROM THE 1972-73
MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM, UNWEIGHTED

INTERPRETATION OF SYMBOLS USED IN CORRELATION TABLES

SYMBOL	INTERPRETATION
PIS/K	Professional instruction staff per 1,000 pupils
T/K	Teachers per 1,000 pupils
AVG EXP	Average years teaching experience
% MAST	Percent of teachers with master's degree
AVG SAL	Average contracted salary of teachers
% MNRTY	Percent of racial-ethnic minority students
WRD REL	Word relationships
READING	Reading
ENGLISH	Mechanics of written English
MATH	Mathematics
COMP	Basic skills composite achievement
GRD MEM	Grade membership (4 or 7)
TOT MEM	Total membership

MICHIGAN ASSESSMENT CORRELATIONS. GRADE 4 SCHOOLS

UNWEIGHTED

THE NUMBER OF OBSERVATIONS IS 2389.

VARIABLE	SUMS	SUMS OF SQUARES	MEAN	SIGMA(N)	SIGMA(N-1)
PIS/K	109389.9855	5130320.5258	45.7890	7.1303	7.1318
T/K	94998.7861	3844973.0093	39.7651	5.3091	5.3102
AVG EXP	23437.5982	965245.0311	9.8106	3.8444	3.8452
% MAST	59646.0913	2200253.3058	24.9670	17.2524	17.2560
AVG SAL	0.27978C6D C8	0.3345915D 12	11711.2030	1703.7523	1704.1090
% MNRTY	31170.5969	2060651.7233	13.0475	26.3120	26.3175
NRD REL	117102.5411	5784C82.1920	49.0174	4.2926	4.2935
READING	119879.8334	6053283.2489	50.1799	3.9737	3.9745
ENGLISH	118976.5530	5961762.7941	49.8018	3.9095	3.9103
MATH	122482.4037	6316805.2191	51.2693	3.9469	3.9477
COMP	120484.5972	6111725.9876	50.4331	3.8450	3.8458
GRD MEM	162439.0000	0.1420111D C8	67.9946	36.3471	36.3547
TOT MEM	1024344.0000	0.5548871D C9	428.7752	220.0440	220.0900

MICHIGAN ASSESSMENT CORRELATIONS, GRADE 4 SCHOOLS

CORRELATION MATRIX

	PIS/K	T/K	AVG EXP	% MAST	AVG SAL	% MNRTY	WRD REL	READING	ENGLISH	MATH
PIS/K	1.0000	0.7388	-0.0491	0.1075	0.0042	0.0450	0.0417	0.0285	0.0087	0.0419
T/K	0.7388	1.0000	-0.0722	-0.0340	-0.1499	-0.0254	0.0622	0.0500	0.0531	0.0799
AVG EXP	-0.0491	-0.0722	1.0000	0.3170	0.4995	0.0065	0.1037	0.1077	0.1236	0.1297
% MAST	0.1075	-0.0340	0.3170	1.0000	0.6245	0.1146	0.0611	0.0450	0.0391	0.0493
AVG SAL	0.0042	-0.1499	0.4995	0.6245	1.0000	0.1570	0.0601	0.0508	0.0481	0.0553
% MNRTY	0.0450	-0.0254	0.0065	0.1146	0.1570	1.0000	-0.5825	-0.6166	-0.5960	-0.6238
WRD REL	0.0417	0.0622	0.1037	0.0611	0.0601	-0.5825	1.0000	0.9332	0.9310	0.9124
READING	0.0285	0.0500	0.1077	0.0450	0.0508	-0.6166	0.9332	1.0000	0.9469	0.9145
ENGLISH	0.0087	0.0531	0.1236	0.0391	0.0481	-0.5960	0.9310	0.9469	1.0000	0.9238
MATH	0.0419	0.0799	0.1297	0.0493	0.0553	-0.6238	0.9124	0.9145	0.9238	1.0000
COMP	0.0280	0.0631	0.1234	0.0466	0.0533	-0.6269	0.9482	0.9773	0.9799	0.9694
GRD MEM	-0.2135	-0.2426	-0.0820	0.0945	0.1249	0.2445	-0.1770	-0.1841	-0.1764	-0.2031
TOT MEM	-0.2267	-0.2634	-0.0379	0.1652	0.2248	0.3188	-0.2187	-0.2301	-0.2195	-0.2479

	COMP	GRD MEM	TOT MEM
PIS/K	0.0280	-0.2135	-0.2267
T/K	0.0631	-0.2426	-0.2634
AVG EXP	0.1234	-0.0820	-0.0379
% MAST	0.0466	0.0945	0.1652
AVG SAL	0.0533	0.1249	0.2248
% MNRTY	-0.6269	0.2445	0.3188
WRD REL	0.9482	-0.1770	-0.2187
READING	0.9773	-0.1841	-0.2301
ENGLISH	0.9799	-0.1764	-0.2195
MATH	0.9694	-0.2031	-0.2479
COMP	1.0000	-0.1922	-0.2380
GRD MEM	-0.1922	1.0000	0.8279
TOT MEM	-0.2380	0.8279	1.0000

MICHIGAN ASSESSMENT CORRELATIONS, GRADE 7 SCHOOLS

UNWEIGHTED

THE NUMBER OF OBSERVATIONS IS 820.

VARIABLE	SUMS	SUMS OF SQUARES	MEAN	SIGMA(N)	SIGMA(N-1)
PIS/K	40497.4949	2073925.1726	49.3872	9.4912	9.4970
T/K	35415.0950	1586329.6813	43.1891	8.3215	8.3265
AVG EXP	6878.5995	67081.1294	8.3885	3.3821	3.3842
% MAST	25248.1962	990433.8264	30.7905	16.1181	16.1279
AVG SAL	9421416.0000	0.11073230 12	11489.5317	1740.7133	1741.7757
% MNRTY	9933.1990	626443.3526	12.1137	24.8438	24.8590
BRD REL	40098.6602	1971146.8895	48.9008	3.5424	3.5446
READING	40891.6143	2044687.9969	49.8190	3.4037	3.4058
ENGLISH	40564.8647	2015195.1760	49.4693	3.2154	3.2174
MATH	41448.1373	2105667.4247	50.5465	3.5969	3.5991
COMP	40975.4963	2056520.6966	49.9701	3.3075	3.3095
GRD MEM	167464.0000	0.49161470 08	204.2244	135.0756	135.1580
TOT MEM	551402.0000	0.46288280 09	672.4415	335.1324	335.3369

MICHIGAN ASSESSMENT CORRELATIONS, GRADE 7 SCHOOLS

CORRELATION MATRIX

	PTS/K	T/K	AVG EXP	% MAST	AVG SAL	% MNRTY	WRD REL	READING	ENGLISH	MATH
PTS/K	1.0000	0.9525	-0.0653	0.0713	-0.0902	-0.0266	0.0903	0.0587	0.0539	0.1036
T/K	0.9525	1.0000	-0.0567	0.0166	-0.1452	-0.1238	0.1486	0.1343	0.1323	0.1766
AVG EXP	-0.0653	-0.0567	1.0000	0.4464	0.5473	0.0339	0.1233	0.0956	0.1600	0.1141
% MAST	0.0713	0.0166	0.4464	1.0000	0.6489	0.0666	0.1416	0.0804	0.1045	0.1177
AVG SAL	-0.0902	-0.1452	0.5473	0.6489	1.0000	0.2296	0.0033	-0.0669	-0.0370	-0.0575
% MNRTY	-0.0266	-0.1238	0.0339	0.0666	0.2296	1.0000	-0.7240	-0.7656	-0.6965	-0.7453
WRD REL	0.0903	0.1486	0.1233	0.1416	0.0033	-0.7240	1.0000	0.9597	0.9314	0.9241
READING	0.0587	0.1343	0.0956	0.0804	-0.0669	-0.7656	0.9597	1.0000	0.9558	0.9326
ENGLISH	0.0539	0.1323	0.1600	0.1045	-0.0370	-0.6965	0.9314	0.9558	1.0000	0.9194
MATH	0.1036	0.1766	0.1141	0.1177	-0.0575	-0.7453	0.9241	0.9326	0.9194	1.0000
COMP	0.0766	0.1534	0.1251	0.1053	-0.0542	-0.7513	0.9596	0.9831	0.9776	0.9736
GRD MEM	-0.1152	-0.1808	-0.1178	0.2236	0.2637	0.1984	-0.0750	-0.1635	-0.1921	-0.1536
TOT MEM	-0.2527	-0.2940	0.0032	0.2210	0.3102	0.1885	-0.0780	-0.1495	-0.1668	-0.1574

	COMP	GRD MEM	TOT MEM
PTS/K	0.0766	-0.1152	-0.2527
T/K	0.1534	-0.1808	-0.2940
AVG EXP	0.1251	-0.1178	0.0032
% MAST	0.1053	0.2236	0.2210
AVG SAL	-0.0542	0.2637	0.3102
% MNRTY	-0.7513	0.1984	0.1885
WRD REL	0.9596	-0.0750	-0.0780
READING	0.9831	-0.1635	-0.1495
ENGLISH	0.9776	-0.1921	-0.1668
MATH	0.9736	-0.1536	-0.1574
COMP	1.0000	-0.1692	-0.1578
GRD MEM	-0.1692	1.0000	0.7569
TOT MEM	-0.1578	0.7569	1.0000

CORRELATIONS AMONG SCHOOL MEANS BASED UPON DATA FROM THE 1972-73
MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM, WEIGHTED ACCORDING TO TOTAL SCHOOL MEMBERSHIP

INTERPRETATION OF SYMBOLS USED IN CORRELATION TABLES

SYMBOL	INTERPRETATION
PIS/K	Professional instructional staff per 1,000 pupils
T/K	Teachers per 1,000 pupils
AVG EXP	Average years teaching experience
% MAST	Percent of teachers with master's degree
AVG SAL	Average contracted salary of teachers in thousands
% MNRTY	Percent of racial-ethnic minority students
WRD REL	Word relationships
READING	Reading
ENGLISH	Mechanics of written English
MATH	Mathematics
COMP	Basic skills composite achievement

MICHIGAN ASSESSMENT CORRELATIONS, GRADE 4 SCHOOLS

WEIGHTED BY SCHOOL ENROLLMENT

THE NUMBER OF OBSERVATIONS IS 1027131.

VARIABLE	SUMS	SUMS OF SQUARES	MEAN	SIGMA(N)	SIGMA(N-1)
PIS/K	0.46190670 08	0.2123705D 10	44.9706	6.7273	6.7273
T/K	0.40120800 08	0.1593487D 10	39.0610	5.0628	5.0628
AVG EXP	9989496.0883	0.1109636D 09	9.7256	3.6667	3.6667
% MAST	0.27119390 08	0.9833662D 09	26.4031	16.1329	16.1329
AVG SAL	0.12227820 11	0.1484901D 15	11904.8266	1686.0896	1686.0904
% MNRTY	0.17849070 08	0.1312589D 10	17.3776	31.2400	31.2400
WRD REL	0.49843170 08	0.2439437D 10	48.5266	4.4911	4.4912
READING	0.51052690 08	0.2555881D 10	49.7042	4.2267	4.2267
ENGLISH	0.50691920 08	0.2519296D 10	49.3529	4.1279	4.1279
MATH	0.52137930 08	0.2664614D 10	50.7607	4.1925	4.1925
COMP	0.51311680 08	0.2580620D 10	49.9563	4.1014	4.1014

CORRELATION MATRIX WEIGHTED BY SCHOOL ENROLLMENT

	PIS/K	T/K	AVG EXP	% MAST	AVG SAL	% MNRTY	WRD REL	READING	ENGLISH	MATH
PIS/K	1.0000	0.7581	-0.0859	0.0469	-0.0629	-0.0595	0.1015	0.0830	0.0639	0.1020
T/K	0.7581	1.0000	-0.0917	-0.0774	-0.1810	-0.1046	0.1130	0.1002	0.0957	0.1297
AVG EXP	-0.0859	-0.0917	1.0000	0.3622	0.5190	0.0017	0.0946	0.0950	0.1103	0.1116
% MAST	0.0469	-0.0774	0.3622	1.0000	0.6416	0.1057	0.0419	0.0270	0.0282	0.0313
AVG SAL	-0.0629	-0.1810	0.5190	0.6416	1.0000	0.1614	0.0337	0.0237	0.0304	0.0288
% MNRTY	-0.0595	-0.1046	0.0017	0.1057	0.1614	1.0000	-0.6734	-0.7010	-0.6809	-0.7139
WRD REL	0.1015	0.1130	0.0946	0.0419	0.0337	-0.6734	1.0000	0.9477	0.9467	0.9336
READING	0.0830	0.1002	0.0950	0.0270	0.0237	-0.7010	0.9477	1.0000	0.9597	0.9362
ENGLISH	0.0639	0.0957	0.1103	0.0282	0.0304	-0.6809	0.9467	0.9597	1.0000	0.9422
MATH	0.1020	0.1297	0.1116	0.0313	0.0288	-0.7139	0.9336	0.9362	0.9422	1.0000
COMP	0.0854	0.1110	0.1075	0.0305	0.0287	-0.7114	0.9599	0.9831	0.9847	0.9771

	COMP
PIS/K	0.0854
T/K	0.1110
AVG EXP	0.1075
% MAST	0.0305
AVG SAL	0.0287
% MNRTY	-0.7114
WRD REL	0.9599
READING	0.9831
ENGLISH	0.9847
MATH	0.9771
COMP	1.0000

MICHIGAN ASSESSMENT CORRELATIONS. GRADE 7 SCHOOLS
WEIGHTED BY SCHOOL ENROLLMENT

THE NUMBER OF OBSERVATIONS IS 957233.

VARIABLE	SUMS	SUMS OF SQUARES	MEAN	SIGMA(N)	SIGMA(N-1)
PIS/K	0.26859150 08	0.13270920 10	48.2009	7.6319	7.6319
T/K	0.23393160 08	0.10052190 10	41.9809	6.4458	6.4458
AVG EXP	4691244.4160	0.45143750 08	8.4188	3.1840	3.1840
% MAST	0.18119370 08	0.71976490 09	32.5167	15.3082	15.3082
AVG SAL	0.65523030 10	0.78526340 14	11758.6407	1629.8102	1629.8116
% MNRTY	7969478.5922	0.54024980 09	14.3378	27.6397	27.6397
WRD REL	0.27163180 08	0.13320230 10	48.7465	3.7681	3.7681
READING	0.27610360 08	0.13755270 10	49.5491	3.6583	3.6583
ENGLISH	0.27405770 08	0.13543390 10	49.1819	3.4077	3.4077
MATH	0.28003080 08	0.14152090 10	50.2538	3.7765	3.7765
COMP	0.27691060 08	0.13829700 10	49.6939	3.5174	3.5174

CORRELATION MATRIX WEIGHTED BY SCHOOL ENROLLMENT

	PIS/K	T/K	AVG EXP	% MAST	AVG SAL	% MNRTY	WRD REL	READING	ENGLISH	MATH
PIS/K	1.0000	0.5347	-0.1045	0.1314	-0.0716	-0.0632	0.1484	0.1191	0.0899	0.1533
T/K	0.5347	1.0000	-0.0881	0.0796	-0.1244	-0.1939	0.2312	0.2203	0.1935	0.2498
AVG EXP	-0.1045	-0.0881	1.0000	0.4327	0.5524	-0.0044	0.1080	0.0902	0.1505	0.1074
% MAST	0.1314	0.0796	0.4327	1.0000	0.6396	0.0140	0.1654	0.1176	0.1410	0.1454
AVG SAL	-0.0716	-0.1244	0.5524	0.6396	1.0000	0.1795	0.0128	-0.0463	-0.0088	-0.0315
% MNRTY	-0.0632	-0.1939	-0.0044	0.0140	0.1795	1.0000	-0.7658	-0.7971	-0.7352	-0.7839
WRD REL	0.1484	0.2312	0.1080	0.1654	0.0128	-0.7658	1.0000	0.9685	0.9459	0.9439
READING	0.1191	0.2203	0.0902	0.1176	-0.0463	-0.7971	0.9685	1.0000	0.9656	0.9470
ENGLISH	0.0899	0.1935	0.1505	0.1410	-0.0088	-0.7352	0.9459	0.9656	1.0000	0.9327
MATH	0.1533	0.2498	0.1074	0.1454	-0.0315	-0.7839	0.9439	0.9470	0.9327	1.0000
COMP	0.1261	0.2274	0.1168	0.1397	-0.0284	-0.7848	0.9702	0.9874	0.9814	0.9783

	COMP
PIS/K	0.1261
T/K	0.2274
AVG EXP	0.1166
% MAST	0.1397
AVG SAL	-0.0284
% MNRTY	-0.7848
WRD REL	0.9702
READING	0.9874
ENGLISH	0.9814
MATH	0.9783
COMP	1.0000